The New Teaching Series

THE GEOGRAPHY OF COMMERCE AND INDUSTRY

THE NEW TEACHING SERIES

Uniform with this Volume

MATHEMATICS OF BUSINESS AND COMMERCE
O H. Cocks and E P Glover

CHEMISTRY FROM THE INDUSTRIAL STANDPOINT
P C L Thorne

NATURAL WEALTH OF BRITAIN: its Origin and Exploitation
S J Duly

PURE MATHEMATICS FOR THE ENGINEER
S B Gates

THE FOUNDATIONS OF ENGINEERING
W H. Spikes

EVERYDAY MATHEMATICS
F Sandon

THE LIGHT OF HISTORY
K. W Spikes

APPLIED BOTANY
G S M. Ellis

CITIZENSHIP
F R Worts

MODERN INDUSTRIAL HISTORY
F R Worts

ENGLISH LITERATURE: the Rudiments of its Art and Craft
E V. Downs

INTRODUCTION TO WORLD HISTORY
E H Short

The Geography of Commerce & Industry

BY

R. S BRIDGE, M A.

SENIOR HISTORY MASTER, NOTTINGHAM HIGH SCHOOL, FORMERLY
SENIOR GEOGRAPHY MASTER, BRISTOL GRAMMAR SCHOOL

HODDER AND STOUGHTON
LIMITED LONDON
MCMXX

FOREWORD

THE book is planned for a three-years course

First year · Chapters I–XV inclusive
Second year Chapters XVI–XXX inclusive
Third year . Chapters XXXI–XLI

In the first year we deal with general principles In the second year we apply these principles to a detailed study of the practical questions connected with the geography of the British Isles In the third year we have tried to work out the subject by considering the various countries of the world not as so many separate units to be treated "regionally" one by one, but rather as parts of a wider organic whole which can be studied with more advantage by groups based upon their relation with the world's great trade routes

The chapters have been so arranged that they can be taken in groups (*e.g* Chapters VII–XII deal with transport) Thus groups may be omitted or reversed in order if necessary In this way by judicious selection a two-years course can be planned which will give the student a sound working knowledge of the subject without omitting too much detail

The Questions have been framed to stimulate the reasoning powers of the student and to ensure a thorough study of the atlas, which is the basis of all sound geographical work. Any good cheap atlas, such as Bartholomew's Comparative Atlas, will do. We do not recommend "Economic" atlases, the use of which tends to make the student take for granted

facts which he should be able to reason out for himself. The student should make his own collection of maps to illustrate such economic facts as distribution of crops, population, etc. Outline maps for the purpose can always be obtained cheaply from any reliable geographical publisher.

We would point out that in dealing with such a wide subject as commerce, much compression has been inevitable, and only the most important countries and facts have been selected for detailed treatment

Political conditions are still so unstable and so many territorial problems are "in the melting-pot" that we have thought it better to refer to countries (*e g.* Austria) as they existed under pre-war conditions

For similar reasons statistics have generally been referred to a pre-war basis. The figures in them have been taken from various Government "blue books" and consular reports, and occasionally from the *Statesman's Year Book*. To these publications and to Chisholm's invaluable *Handbook of Commercial Geography* the student is referred for more detailed information.

CONTENTS

PART I

GENERAL

CHAP		PAGE
I	PRIMARY CONSIDERATIONS	1
II	ZONES OF LIFE	4
III	INFLUENCE OF CLIMATE AND PHYSICAL CONDITIONS ON THE WORLD'S CROPS	8
IV.	WOOL	13
V.	COTTON	18
VI.	MINERALS	22
VII.	ESSENTIALS OF TRANSPORT	29
VIII.	THE DEVELOPMENT OF TRADE ROUTES	33
IX.	THE OCEAN HIGHWAYS	37
X.	THE WORLD'S SHIPPING	42
XI.	INLAND WATERWAYS	46
XII	RAILWAYS AND COMMERCE	52
XIII.	INFLUENCE OF COMMERCE ON THE DISTRIBUTION OF POPULATION	59
XIV.	CAPITAL, LABOUR AND COMMERCE	62
XV.	THE MACHINERY OF EXCHANGE AND DISTRIBUTION	66

PART II

THE BRITISH ISLES

XVI	CLIMATE AND CONFIGURATION	71
XVII	NATURAL RESOURCES	76
XVIII	OUR SEAPORTS IN GENERAL	81
XIX.	OUR SEAPORTS IN DETAIL	85

CHAP		PAGE
XX	OUR MERCANTILE MARINE	100
XXI	INLAND WATERWAYS	106
XXII	RAILWAYS	113
XXIII	MORE ABOUT RAILWAYS	118
XXIV	COMMERCIAL FACTORS IN THE DISTRIBUTION OF OUR POPULATION	124
XXV	COAL, IRON AND STEEL	129
XXVI	TEXTILES	134
XXVII	SOME ASSOCIATED INDUSTRIES	139
XXVIII	WHEAT	143
XXIX	FISH AND LIVE STOCK	149
XXX	TRADE WITH THE TROPICS	155

PART III

A—EUROPEAN TRADE ROUTES

XXXI	EUROPE NORTH OF THE GREAT MOUNTAIN AXIS	159
XXXII	EUROPE NORTH OF THE GREAT MOUNTAIN AXIS (*continued*)	169
XXXIII.	THE MEDITERRANEAN AND BLACK SEA	179

B—THE ATLANTIC ROUTES

XXXIV.	NORTH AND SOUTH AMERICA IN GENERAL	190
XXXV	BRITISH POSSESSIONS	196
XXXVI	THE U S A	205
XXXVII	THE U S A (*continued*)	212
XXXVIII	SOUTH AND WEST AFRICA	221

C—THE SUEZ AND INDIAN OCEAN ROUTES

XXXIX.	BRITISH INDIA AND THE FAR EAST	228

D—AUSTRALASIA AND THE PACIFIC

XL	AUSTRALASIA	243
XLI	THE PACIFIC	254

PART I

GENERAL

CHAPTER I

PRIMARY CONSIDERATIONS

THE geography of commerce deals with trade—that is, with the exchange of goods between one country and another.

Countries differ in their wants because they do not all produce the same commodities One country may be rich in coal, for example, but may not be able to produce tea, another may produce tea but may lack coal So the coal of one is exchanged for the tea of the other Thus we find that commerce deals with the exchange of goods In this way countries buy from and sell to other countries The things bought are called *imports*, and the things sold or exchanged for them are called *exports*

But goods cannot be exchanged if there are no means of bringing them to the people who want them. If we have coal and Ceylon has tea, then we can exchange our coal for her tea only if there are ships to transport these goods Here we have another idea—that of transport—and we shall find that commerce cannot exist without it The geography of commerce therefore deals with—

1. The commodities which countries can produce
2 The exchanging of these commodities, *i. e.* importing and exporting
3 Getting these goods to market, *i. e.* transport.

Now the things a country can produce are either raw materials (*i. e* commodities in their natural state) or manufactured articles

Raw materials we speak of as being either animal, vegetable or mineral in origin. Most animals depend for life on vegetation in some form or other; so that the causes which produce vegetation must also affect animal life We know, of course, that it is the climate of a country which causes the growth of different vegetation—trees, grass, crops or whatever it may be. Obviously hot countries, therefore, will not produce the same vegetation as cold countries. It follows that the animal life of hot countries must differ from that of the colder regions.

We can, therefore, divide the world up into belts or zones of life, each having characteristics of its own. In studying these belts we shall find out the causes for the different natural resources of countries We shall discover, for instance, why coffee is grown in Brazil; why Australia rears large numbers of sheep, why some areas have vast forests and why others have no vegetation.

It is, of course, of the utmost importance for traders to know what products come from different areas and for settlers to know what crops can be grown and what animals can be reared

It is important also to know about the physical features of a country, for they influence commerce in many ways Mountains may hinder transport, rivers may afford water supply and means of carriage, rocks may contain mineral wealth, climate may affect man's capacity for labour, his customs and mode of living

Now man by his ingenuity and with the advance of scientific knowledge is getting more and more control over nature Certainly if a country does not contain mineral wealth man cannot alter this state of things, nor can he control climate and weather Nevertheless he can do much to lessen the discomforts of

climate and to develop and make the most of the resources of a country as he finds them Thus, if an area lacks sufficient rainfall for agriculture, much may be done by "dry farming" and irrigation When the soil is poor it may be made richer by supplying artificially the food necessary for plant life. This we call "manuring" the soil If a tropical area is unhealthy it can, by scientific methods, be made fit for white men to inhabit, as we have seen in the case of the Panama Canal area. If there are minerals below the earth's surface, man can mine them and make use of them. If there are mountains or rivers as obstacles, modern engineering science can overcome them. All these things can be done if man chooses to work.

It all comes to this, then—when we have made due allowance for the effects of climate and physical features, it is on man's efforts that commerce must really depend. And it is on this "human control," as it is called, that we must particularly insist when we study commercial geography

CHAPTER II

ZONES OF LIFE

In the last chapter we saw that it is climate which principally affects the distribution of vegetable and animal life We have now to study this distribution more closely.

Of course we cannot within the limits of a chapter deal with climate in detail, and we shall have to assume that the student has an elementary knowledge of the principles of climate. At the same time there are some very important facts of which we must remind the student if he is to understand how vegetation and animal life have developed and how they enter into commerce. There are, as we know, three belts of life arranged according to the zones of temperature, viz the hot or tropical, the temperate, the cold or arctic Secondly, we know that we can roughly divide the world from the point of view of climate into two areas

1 Those parts which have little or moderate seasonal changes, *i e* which have an equable climate with small or moderate range of temperature

2 Those areas with great differences in seasonal or daily temperatures, *i e.* those which have an extreme climate

Thirdly, we must remember that the influence of water, either in the form of ocean or lakes or rainfall, tends to lessen the range of temperature; in other words, to make the climate of a place more equable.

We can state this in another way —

Those places near the sea or with heavy rainfall

have equable climates Those places far inland and with small rainfall have extreme or "continental" climates.

We must not forget such things as altitude, ocean currents, and the fact that some places have their maximum rainfall in winter, some in summer, while other places have heavy rain throughout the year.

Plants must have heat and moisture as well as light - It follows, therefore, that the hotter and wetter it is the greater is the growth of vegetation that the drier and more extreme the climate the less is the plant life and that where great heat and great rain come at the same time, there will be the thickest vegetation.

Thus we can understand that vegetation is most luxuriant in the tropics, not so luxuriant in temperate lands, and thins out to nothing as we reach the poles. We can find exceptions—for instance, most of the Sahara desert is in the tropics—but on the whole our general statement is correct enough for our purpose

Now plants are by nature adapted to these varying conditions of climate and soil Take, for example, trees Those which shed their leaves every year are adapted to temperate climates. We call such trees "deciduous," those which do not shed their leaves are "evergreen," or if they are of the fir-tree type are called "coniferous"

Grasses and bulbs, or plants with long roots, are adapted to stand want of rain and extremes of temperature.

You should compare a rainfall map of Australia or Africa with the vegetation maps of these countries. You will see, for instance, that the vegetation in Australia is most luxuriant on the eastern side of the Great Dividing Range, and thins out as one goes westwards, until in the interior of the continent we find desert. The belts of vegetation tend to arrange

themselves according to the belts of rainfall Thus from the coast to the interior we have—

1 Tropical forest
2. Thinner forests
3. Grasslands with trees—"savannah" type.
4 Grasslands—absence of trees—"steppe" type.
5 Scrub
6 Desert

The same applies to South Africa

Let us now attempt to sum up what we have been saying We will omit the question of altitude —

1 Areas of very small ranges of temperature *Tropics*—no marked seasonal change Thick forests —much undergrowth—quick growth—tropical fruits As we pass to sub-tropical conditions the forests will be more open and grass will appear Monsoon type

2 Areas of moderate ranges of temperature. *Temperate*—marked seasonal change

(*a*) British Isles type —deciduous trees—temperate crops, such as wheat Temperate fruits (apple, etc)

(*b*) Mediterranean type —those with hot, dry summers and most rain in winter Plants which are adapted to drought conditions.

(*c*) Those with most rain in summer, *i. e* moderate rain well distributed. Maize.

3. Areas with extreme climates

(*d*) Cold deserts or tundra Alpine plants, dwarf bushes, and on the margin coniferous forests.

(*e*) Hot deserts. Plants adapted to drought conditions, *e g.* cactus

(*f*) Grasslands Plants adapted to extremes of temperature.

Now let us summarize the above zones of vegetation according to the plants they contain which are commercially useful.

1. *The Tropics.* Forests, woods are hard and used for cabinet making, *e g.* mahogany The most important trees are the rubber, coco-nut palm, oil palm The most important crop. sugar-cane: monsoon region, rice. Sub-tropical trees, teak, crop, tea

2. Temperate

(*a*) British Isles type woods for general purposes, *e g* oak, elm, ash, etc. Crop, wheat

(*b*) Mediterranean type · trees, cork-oak, olive Crop, vine

(*c*) Summer rain type Crop, maize and cotton

3. Areas with extreme climates

(*d*) Fir trees—used for pit-props, wood-pulp, etc.

(*e*) Date palm—shrubs producing gums.

(*f*) Cereals, especially wheat.

As regards animal distribution it is sufficient to note that—

(*a*) Fur-bearing animals, for obvious reasons, belong to the arctic zone.

(*b*) The domesticated animals, which are the most important commercially, are found in the grasslands

For example, horses on the steppes of Russia, pigs in large numbers where they can be fed artificially on maize (*e g* round Chicago), sheep on the poorer and drier pastures, cattle on the wetter and richer meadowlands.

CHAPTER III

INFLUENCE OF CLIMATE AND PHYSICAL CONDITIONS ON THE WORLD'S CROPS

We have now to inquire into the effect of climate and physical conditions on the distribution of plants which enter largely into commerce Suppose we divide the plants into two broad divisions Those of the temperate zone and those of the tropical zone.

We will begin with the group known as cereals, *i e* wheat, maize, barley, oats and rye, which are essentially plants of the temperate belt

None of these flourishes in great heat or in heavy rainfall, and they differ as regards their requirements for growth The first two are not so well adapted to extremes of temperatures as the others. Barley has the widest range of distribution oats and rye can stand poorer soils and colder conditions Let us take them in order —

Wheat is a plant with a heavy head, and therefore requires a stiffish soil, so that its roots can get a good hold of the ground, so it will not flourish on sandy soils, but requires a clay or loam Rain in the season of growth and a hot, dry summer for ripening are also necessary The bigger the fields for cultivation the more machinery can be used, and the more cheaply the corn can be grown and harvested One kind of wheat will flourish, then, on plains such as the prairies of Canada and the U S A, the steppes of Russia and Siberia, the plains of Argentine and those of Australia, Hungary, France, the Eastern Counties of England, and the Mediterranean countries.

Another kind of wheat ripens in winter and is harvested in spring Such is Indian wheat, which has to be grown in the cool season and harvested before the very hot season commences The Punjab and N W. Provinces are the great wheat areas, and lack of rainfall is made good by an extensive irrigation system

As a result of long culture and improving scientific methods, the varieties of this plant are many Some wheats, English for example, are moist, some are hard, Indian for instance, Australian wheat is brittle; some require washing before being ground, and some do not Millers, therefore, have a good variety from which to choose, and often mix one kind with another —say, a drier kind with a moister kind—Chilian with English for example.

Owing to the wide distribution of the crop, hardly a month passes in which we do not import wheat from somewhere This is very convenient, because we do not need to store a vast quantity, and if the crop fails in one country we can import more from another country where the crop is good

Maize is a crop which requires a longer summer to ripen it than wheat, and which can stand more rain in the ripening period

Thus it can be grown best in areas which receive moderate rain in the summer months. Such areas are the U S A, immediately south of the Great Lakes, Russia, Argentine and Rumania Obviously it is not suited to the Mediterranean area It is a crop which yields very abundantly and is cheap to produce Some countries, such as the Argentine. are finding it a very profitable crop, and are developing its cultivation and lessening that of wheat. As it is used largely for feeding-stuffs for cattle and pigs, it ranks next in importance to wheat as an import to the United Kingdom

Barley has the widest range of any of the cereals,

and is important for brewing The conditions which suit wheat will suit barley, which, moreover, can stand greater cold Thus it can be grown in more northerly latitudes than wheat, and also in Mediterranean countries

Oats and rye will flourish on poorer soils and in colder and wetter climates Thus oats are grown largely in Scotland and Ireland, rye on the poor soils of the plains along the Baltic The greater quantity imported into the British Isles we shall expect to come from North Germany and Russia

Now let us turn to plants which require very different conditions, namely, much heat and much rain, conditions obviously which exist in the tropics. Such plants of commercial value are coffee, cacao, sugar-cane, tea, rice and rubber. All these can stand great heat, but coffee and tea less so than the others These two require shading when the plants are young Moreover, they cannot stand so much moisture. So we shall be right in distributing tea and coffee along the hill slopes and well-drained ground Rice flourishes best in the tropical deltas, sugar along the tropical coastal plains, rubber and cacao in the hot, wet interiors of tropical continents and islands The following will be, then, the chief areas of production —

Coffee—The slopes of the Brazilian Highlands; Costa Rica, Mysore, and, in recent years, Uganda; Nyassaland

Cacao—The valleys on the eastern or wet side of the Andes (north and central), *i e* Ecuador, Brazil Also West Africa and Java

Tea—Central and Southern China; the Assam Hills, the lower slopes of the Himalayas, Darjeeling for example, Formosa, Japan

Sugar-cane—The coastal plains of Brazil, round Pernambuco for instance, British Guiana, Natal, N E Australia (Queensland); Mauritius, Java, the West Indies, Fiji and Hawaii.

Rubber.—The Amazon Basin (Brazil), Peru, Malay Peninsula, the East Indies; Nigeria, etc

Rice, as we have said, is grown in all the tropical deltas and on irrigated and terraced slopes of hills in China But it is an article which enters comparatively little into commerce, as it is generally the food of the people who grow it Burma exports most rice, as the population is not large and does not consume all the rice it produces.

All these plants in tropical areas are grown where labour is performed by the coloured races and is consequently cheap

Lastly, the student should notice the different portions of the plants from which these various products are obtained. Thus, tea from the leaves; coffee from the berries, cacao from the beans or pods; rubber from the latex or juice of the rubber tree; sugar from the stalk or cane, and so on.

QUESTIONS ON CHAPTERS II AND III

1 Why is one side of a mountain range often much drier than the other?

A well-defined dry side is said to be a "rain-shadow" area

Find well-marked rain-shadow areas in the north of Europe, N. Africa and the Mediterranean countries

2 Examine a map showing the vegetation of the world

(*a*) What two great tropical forest areas are there?

(*b*) What two great forest areas are there between 45° N. and the Arctic Circle?

How will the trees of (*a*) differ from those of (*b*) as regards their uses and value in commerce?

What difficulties are there in developing commerce in such areas?

3. How are the great grasslands important commercially? Why can their resources be easily developed?

Find and name the great grasslands of the world, and distinguish between prairies, savannahs, steppes, pampas, llanos

4 On an outline map of the world mark the chief wheat-producing areas and the ports from which you might expect the wheat to be exported

5 Explain as simply as possible how temperate and tropical products differ in their climatic requirements

6 Moscow and Edinburgh are in the same latitude

Look up your climate maps and see how these two places differ in temperature and rainfall. Write down the figures for each and try to explain the differences

CHAPTER IV

WOOL

Wool has been a most important article of commerce for centuries At one time England was the great wool-producing country, and even to this day the Lord Chancellor who presides over the House of Lords always takes his seat on the "woolsack," as a reminder that once our greatest source of wealth was wool.

With the advance of civilisation wool has become more and more used, and the demand for it increases every year

It is difficult to say exactly what is wool, pure and simple, and what is hair For instance, the hairy covering of such animals as the South American llama and the South African and Asiatic Angora goat is classified as wool Here we shall take wool to mean the wool of the domesticated sheep.

It was estimated in 1913 that the number of sheep in the world was nearly 620,000,000, of which the British Empire contained one-third

This shows how important it is for us to know about such a valuable empire product

You will remember we said (in Chapter II) that sheep require the drier and poorer pastures. In fact, it is most noticeable how the amount of rainfall determines to a great extent the distribution of sheep If you take a map of Australia showing the isohyets, or lines of equal rainfall, and mark off the areas bounded by the 10″ and 20″ isohyets, you have within these limits the main sheep-producing regions, which

will be bounded on the north by the 75° isotherm, as sheep being well covered cannot stand too great a heat You will notice that the above areas are mostly on the dry side of the mountains, and are often downs or plateaux, much above sea-level.

In Australia, then, and in South Africa sheep will be reared best on the western side of the eastern mountain system In the South Island of New Zealand, on the other hand, the east side will be the dry side, and it is here that the Canterbury plains are situated, and large flocks are reared

In the Argentine the conditions are similar. The interiors of Europe and North America (U S.A.) are also obviously suitable regions, and the British Isles are still one of the great sheep-rearing countries of the world.

The chief sources of wool supply may, then, be stated as follows —

The British Empire	*Foreign Countries*
Australia and Tasmania.	U S A.
New Zealand.	Argentine
British Isles.	Hungary.
South Africa.	Germany
Falkland Islands	Russia

But nearly every country has flocks of one kind or another, the type of sheep varying according to differences in climate and latitude.

From a commercial point of view those fleeces are more valuable which are most easily used for manufacturing purposes.

Wools differ in texture and in length of "staple," *i. e.* the length of a lock of wool fibres. Some wool is coarse, some is short stapled, some long stapled, some is curly, and other wool is straight Naturally, the purer the wool the better it is The finest wool comes from the "merino" sheep in Australia, the original

stock of which was imported from Spain, where the merino was first bred

Wools differ in what is called "felting" properties, which means the capacity wools have for making a very compact substance when rolled or pressed Short curly wools are suitable for felting, and are manufactured into heavy flannels, etc. The longer stapled wools are used for lighter and more open cloths We shall learn more about this when we study wool manufacture in detail

If we exclude the merino breed we can safely say that England has always been the pioneer in the rearing of the other breeds of sheep, and for years prize animals from our principal flocks have been exported all over the world for breeding purposes. Some of our most famous breeds are South Down, Cotswold, Cheviot, Lincoln, Leicester, and Romney Marsh. Observe that some of these come from mountain pastures and some from valley pastures

Sheep are bred to produce mutton and wool; but once a breed is found to be a good wool-producing one it is bred for that purpose alone and is not mixed, or "crossed," as we say, with inferior breeds.

Cross-bred sheep may give good wool and good mutton, but they cannot produce the best wool. Thus cross-bred sheep are largely reared in New Zealand for the frozen mutton trade. Indeed, so profitable is this trade that Australia, too, is going in more for cross-breeding

The wool, after being sheared from the sheep, is either sold in its original greasy state, or it is cleaned first or "scoured" of its grease, in which state it is sold at nearly double the price.

London used to be the great wool market, and buyers from all over the world would attend the sales, but lately business firms have found it more profitable to send their representatives to Australia or New Zealand, or wherever the market may be, and

to buy the wool on the spot Sales are held regularly at Sydney, Melbourne, Brisbane, Fremantle, Geelong, Adelaide, Hobart and other places, and there are also sales in South Africa at such centres as Durban and East London, and on the Continent of Europe at Antwerp and elsewhere.

The number of countries from which we import wool is really astonishing In 1913 our wool imports came from something like thirty different countries, even countries like Iceland, Morocco and Persia supplying a certain amount

Western Europe consumes much Australian wool, and our ships have a large share in the trade to France and Belgium. The wool season is an important one for shipping purposes, and much tonnage is employed in transporting the wool from Australia to Europe, America or Japan As it is important that the wool supplies should reach the British Isles regularly and quickly, steamers take the Suez route, and generally arrive here between November and May We are the greatest wool manufacturing country, and in 1913 imported raw wool to the value of £35,000,000 Australasia supplied over £20,000,000 worth, South Africa £5,000,000, and British India £1,659,000 worth. In future years, as countries like the United States and the Argentine are bound to consume more and more of their own wool supplies, it is clear we shall have to depend to a still greater extent on our Empire resources.

QUESTIONS ON CHAPTER IV

7 On an outline map of the world insert the chief wool-producing areas mentioned in this chapter

8 Construct a map, according to directions in this chapter, showing the relation between rainfall, temperature and sheep distribution in Australia

Fill in the chief wool markets

9 Why are sheep reared west of the Great Dividing Range in Australia and cattle east of it?

10 By what route would a consignment of wool from the Darling Downs reach Brisbane?

11 Find on your map the junction of the Murrumbidgee and Murray rivers

Supposing we had a consignment of wool to send from there to the coast, and supposing the Murray were navigable to its mouth—

How could the wool be sent (*a*) to Adelaide, (*b*) to Sydney?

What is the distance of each route? Which route would you choose for the purpose? Give your reasons

12 Draw a rough outline of the South Island of New Zealand

Insert the Canterbury Plains and write the word "sheep" across them

Insert the following frozen mutton and wool ports Dunedin, Oamaru, Wellington Indicate by arrows the directions in which the wool and meat will be exported

CHAPTER V

COTTON

COTTON is the fibre adhering to the seeds inside the pods or bolls of the cotton plant, a shrub which varies in height from two or three feet to twenty

Generally speaking, the conditions necessary for the successful growth of the plant are a deep, moderately heavy and well-drained soil, and a hot summer with frequent light showers A hot and dry summer or frost in the spring is injurious to the crop, unless, of course, lack of rain is made good by irrigation Cotton, then, is generally considered as a plant of the sub-tropical area as distinguished from the hot and wet area along the Equator, and the best cotton comes from districts within the influence of the sea The shrub when it is planted annually is usually sown in spring and the crop is gathered during August and the next four months When the seeds are ripe, the pods burst open and the white cotton is seen clinging to the seeds The fibre and seeds are together plucked out of the pod by hand and are afterwards separated The pure fibre or "lint," as it is then called, is the raw cotton of commerce The seeds are crushed to produce oil As we shall see in a later chapter, there is a great industry in oil seeds

The conditions under which cotton is picked are very trying to the labourers. The work is hot, monotonous, and can be done only by coloured labour; a condition of things which not so very long ago led to the employment of large numbers of slaves.

Let us sum up the necessary conditions for cotton growing They are —

1. Regions of hot summers and light summer rain, or irrigation.

2 A large supply of cheap (coloured) labour

The chief cotton-producing areas are, then, as follows —

Country	*District*
The U S A	Islands off S E coast The states of Texas, Louisiana, Mississippi, Alabama, Georgia, North and South Carolina
Egypt	The Lower Nile Valley and Delta
India	N W Deccan, *i e* Dhawar, Hyderabad, Nagpur, Berar Sind, the extreme south of India, United Provinces and the Punjab
Brazil	States of São Paulo, Minas Geraes, Bahia, etc
Russia	The valleys of the Caucasus Mountains, Russian Central Asia in such areas as Ferghana, Bokhara, Tashkend, Khojend, Khiva
Peru	The Coastal Plain

Less important sources of supply are the West Indies, British East and West Africa, Japan and China

We must notice that some of the principal areas require irrigation It is fairly obvious that these will be Egypt, Sind, Peru and the Russian areas, as all these have little or no rain, and all are crossed by, or are near, rivers. You should find out the names of the rivers

Of the other principal areas we must note that Brazil and India have their cotton districts sheltered from the heavy tropical rainfall The monsoons cause the western side of the Western Ghats to be too wet for cotton growing, and the trade winds similarly affect the eastern side of the Brazilian Highlands. So in both cases the cotton is grown further inland in districts not directly affected by the rain-bearing winds In the Deccan the soil is most suitable and

very fertile, and is capable of retaining much of the moisture it receives

Now cotton, like wool, varies in the length and coarseness of its fibre The longer and finer fibres are the best. These come from the U S A areas, especially from those islands we mentioned just now This " sea-island " cotton, as it is called, is also produced in the West Indies and in Egypt So we may say that the best cotton imported into the British Isles comes from the United States and Egypt. The coarser and shorter-stapled cotton comes from the other areas, or at least from some of them, since not all the countries we have named can produce sufficient cotton for themselves and for export. This is the case with Russia

Our main imports of coarser cotton come, then, from India, Brazil and Peru. Let us see what ports are engaged in the export trade

In the U S A there will be . New Orleans, Savannah, Galveston, Mobile, Pensacola, Charlestown, Wilmington

In India, Bombay is very handy for the main supplies. You will see how the main line runs eastwards from it through the cotton areas There are large cotton mills at Bombay, and the railway can bring supplies of coal to the mills as it is in touch with the coalfield of Raniganj. Cotton from Sind, can be shipped from Karachi direct or can be sent to Bombay to be manufactured.

The Egyptian crop is shipped from Alexandria, the Brazilian crop from Bahia and Pernambuco, Peru cotton is exported from Callao

The world's demand for cotton is constantly increasing, and as the United Kingdom is the greatest cotton manufacturing country in the world it is not surprising to learn that we import annually raw cotton to the value of £70,000,000 This is twice the value of our imports of raw wool

As countries such as the U S A and Brazil are becoming cotton manufacturers on a large scale, they are every year using up more and more of their own supplies of cotton and exporting less India, too, is doing the same, so that it is clear that before long the United Kingdom will have to find new sources of supply And, let us hope, these will be in Empire territory, for there is no doubt that our Empire could produce a great deal more cotton than it does at present India, with improved methods of cotton growing, can undoubtedly produce a better and larger crop The West Indies and Egypt are capable of producing a bigger crop of the best kind. Nigeria, the Sudan, Nyassaland, are all promising areas provided that the necessary labour can be found and the transport difficulties overcome, and in 1918 experiments proved that excellent cotton can be grown in Mesopotamia

So there seems no reason why the British Empire should not be in the future largely able to supply her own wants as far as raw cotton is concerned.

QUESTIONS ON CHAPTER V

13 Describe the route by which a consignment of cotton from Nagpur (India) would reach Manchester

14 Why is coloured labour used for cotton-picking?
What advantages and disadvantages are there in using this kind of labour?
At what time of the year is the cotton crop gathered?

15 What cotton areas of the world need irrigation? Find out why these regions have so little rain and why their rivers have a large volume of water

16 Draw a map of the cotton-producing states of the U S A and of their ports mentioned in this chapter Draw arrows from the ports indicating that the cotton will be exported across the Atlantic to Liverpool

CHAPTER VI

MINERALS

Most mineral deposits have been formed far beneath the earth's surface and are found in the older rocks They are most easily obtainable where the older rocks have been pushed up and afterwards exposed by the denudation of the younger rocks

The flanks of older mountain ranges and plateaux are therefore likely to contain most mineral wealth But some of the recent strata contain minerals such as oil and salt

Now the fact that a country has mineral wealth does not necessarily mean that any mining will take place. Mining depends on much more than geology

We must have labour to work the mines, we must have money to buy the necessary machinery and to pay the labourers, and when the ore has been produced there must be the necessary means of transport to get it to the markets.

All these things and more have to be taken into account, but, as we shall discuss them in later chapters, we need not say more about them here

The minerals of the world are most numerous and varied, so that we can deal here only with those which enter most largely into commerce Of these coal and iron are by far the most important Accordingly we must treat them in some detail We will take coal first

This mineral is widely distributed and varies in kind according to the amount of carbon and gases it contains The ordinary coals for household and steam purposes are known as "bituminous" coals

Some of these make very good coke, some do not. Then there is a class of inferior coals known as "brown" coals and "lignite." Lastly there is the coal known as "anthracite," which is difficult to light but in burning gives out great heat, and, in addition, burns without smoke Such coal is largely used for naval purposes and is mined in large quantities in South Wales and in Pennsylvania (U S A)

The demand for coal, especially in manufacturing countries, is very great, and there are very few countries which can produce sufficient for their own wants and have enough over to export Of the great coal-producing countries only the United Kingdom, U S A , and Germany can export coal in large quantities Japan, India and Australia all export coal on a smaller scale, and other large producers of coal, though not for export, are Belgium, Russia, France and Austria China has enormous coalfields practically unworked.

The following Table shows some of the chief coalfields and contains other interesting information to which we shall refer

Country	Coalfields	Principal customers
U K	S Wales, Lancs and Yorks , Lanarkshire, etc	Italy (9½ million tons), France, Germany, Spain, Sweden, Norway, Russia
Germany	Pilsen (Bohemia), Chemnitz (Saxony), Ruhr, Upper Silesia, etc	Switzerland, Holland, Belgium, France, Russia
U S A	Pennsylvania, West Virginia, Illinois, Ohio, Kentucky, Indiana, Alabama	Mexico, Cuba, Canada (14 million tons)
Br India	W Bengal (Raniganj), etc	Ceylon, Straits Settlements, Sumatra
Australia	Newcastle (N S W), etc	N Z , Chile (850,000 tons), Hong Kong, Hawaii, etc

In addition, Japan exports to Hong-Kong, Straits Settlements and China (1,250,000 tons). There are some interesting facts to be extracted from these figures.

1. Notice the large export of coal from the British Isles to Italy This is because Italy has no coal and has to import all she requires

2. The German export trade is all concerned with neighbouring countries because they are all in touch with numerous German railways, and thus transport is simple.

3 Canada has large coalfields of her own (in Vancouver Island for instance). Why does she have to import so much from the U S A ? What coalfield will be the most handy for export ?

4 China has enormous coal resources Why does she import from Japan ?

5 Notice the Australian export to Hawaii The coal will be shipped to Honolulu. There are no manufactures there, so for what is the coal used ?

6 What coalfield will most easily supply Cuba ?

7 Why does Ceylon get its coal from India ? Why should Colombo require coal ? You see that there is much information to be obtained from what looks at first sight to be a very dry catalogue of names, and that commercial geography is not all mere memory work.

Try to answer the above questions by making use of any maps that will help you For instance, a map showing the population of Canada might help to explain question 3 You should fill in the countries and coalfields in an outline map of the world and add to it the following—

In France the coalfields of Lille, Creuzot, St Etienne

In Belgium the coalfield stretching from the French frontier through Namur and Liège to Aachen.

We now come to *Iron* This mineral occurs in the form of ores and most frequently near coalfields We

find, therefore, that the coal-producing countries are also iron-ore producers This is very fortunate, as steel is made from iron ore smelted with coal. Thus very often the cost of carrying the ore to the coalfields is saved

Ores naturally vary in kind and quality Roughly speaking, two and a half tons of ore are required to produce one ton of pig-iron

The largest producers of iron ore are shown in the following Table

Country	Total production, 1912, in tons	Principal mining centres	Proportion exported
U S A	55,000,000	Lake Superior region—states of Minnesota, Michigan, Wisconsin	—
Germany	32,000,000	Luxemburg, German Lorraine —Lahn Valley, Westphalia, Harz Mountains	$\frac{1}{5}$
France	18,700,000	Normandy, Pyrenees — N E France, *i e* Briey, Longwy, Nancy	$\frac{4}{5}$
U K	14,000,000	Cleveland Hills, Northants, Lincoln, Leicester, Cumberland	—
Spain	About 8,600,000	Santander, Navarre, Guispuscoa, Lugo, Guadalajara	$\frac{5}{6}$
Sweden	6,600,000	Dannemora in South, Gellivare in North Sweden	$\frac{1}{6}$

From the above figures we learn that—

1 The U S A. is not an exporter of ore the fact being that she uses such a vast quantity in her iron and steel manufactures that she actually has to import some ore

2 Germany is obviously also a manufacturer of steel on a large scale.

3. The same applies to our own country

4 The chief exporters of ore are Spain and Sweden

Relatively to her population, Sweden is the greatest iron-ore producing country in the world Most of our supply of imported ore comes from these two countries. Iron ores are, however, widely distributed, and many other countries contain large deposits, especially of manganese ore, which is useful because a small quantity of manganese is required in nearly all steel productions.

Russia exported a good deal before 1914, and she undoubtedly possesses large resources. The U S A and Germany also have considerable resources, and other countries with promising supplies for the future are Brazil, Canada China and Australia. Indeed, in South Australia, it is said, there are two hills called the Iron Knob and the Iron Monarch which are practically masses of iron ore

We must now rapidly summarize some of the important minerals which we have not dealt with already

Copper occurs usually in veins Over half of the world's supply comes from the Great Lake region of U S A Huge quantities are shipped from Duluth Important mines also in Spain (Rio Tinto mines), Australia, Moonta (S A), Cloncurry and Mount Morgan (Queensland), Cobar (N.S.W), Chile, Germany, Japan and China Smelted with tin, copper makes bronze, and smelted with zinc makes brass

Tin occurs either in veins (as in Cornwall), or in river deposits The latter are more easily worked. With iron it is smelted to make tin plating. Camborne and Redruth in Cornwall still produce tin, but the main supplies come from the Malay States and the Dutch East Indies, Banka and Billiton (two islands), Bolivia; Australasia (especially Mount Bischoff, N W. Tasmania).

Zinc—Largely used in coating steel sheets to make galvanized iron Commercial zinc is known as "spelter." Germany, Belgium and Australasia

(N.S W and Tasmania) are the largest producers At Broken Hill (N S W) are the greatest silver-lead-zinc producing mines in the world

Lead —Often found in conjunction with silver ores The U S A is easily first in production and is followed by Australia, Spain and Mexico

The precious metals —

1 *Gold* —Occurs either in veins or in alluvial deposits The famous mines of " the Rand " district, near Johannesburg in the Transvaal, supply half the world's production. In 1912 these mines produced gold to the value of £38,000,000 Then come the U S A , Australia (especially West Australia), Canada, the Gold Coast, Rhodesia, Mexico, Russia, India, etc

2 *Silver* —Generally in veins. Often in the form of silver-lead ores Produced on a large scale in Mexico, U S A. (Nevada, etc), Australia (Broken Hill), Canada, Peru, Bolivia

Petroleum —Produced under different natural conditions For example, the oil-bearing strata in Pennsylvania (U S A) are geologically ancient and the district is wooded, whereas in California the strata are recent and the district is largely of a desert character The chief oil fields are—

1 U S A (Pennsylvania, Texas, California)

2 Russia, at Baku (near Caspian Sea), and at Grosnic in the Caucasus Mountains

3 Burma

4 Galicia

5 Roumania

6 Persia (the Anglo-Persian Oil Company's fields near Basra).

The way it is obtained is as follows. A shaft is sunk to the oil-bearing strata and the oil may either rise freely (like the water in an artesian well) or may be pumped up. It is then taken or pumped through pipes (as at Baku and in Burma) to the refineries. The oil in its crude state is brown, or

nearly black In the refineries it is heated in retorts or "distilled," as it is called This operation divides the lighter oils used for burning purposes from the heavier oils fit for greasing or lubricating From the heavier oils, by further processes, vaseline and solid paraffin are obtained

Petroleum is now shipped in specially-constructed steamers—"oil-tankers" It is used in petrol motors and also as a fuel for ships, and is mixed with gas for lighting purposes in towns Its many uses make it a most valuable commercial product Finally, we must not forget that recent (1919) boring operations in our own islands have proved that there are distinct possibilities of a future oil supply underlying the rocks in Derbyshire and the Norfolk shales

CHAPTER VII

ESSENTIALS OF TRANSPORT

TRANSPORT is either by water or by land—in other words, by ship or by rail It is true that human beings, pack animals and motors are used to carry goods, and that in the near future the airship may be used for the same purpose. Nevertheless, when we talk about means of transport it is ships or trains that we have in mind. In this chapter, then, we shall consider these only.

We must remember that we have to deal with the subject from the point of view of the merchant and from the point of view of the Railway Company or shipowner

Now it is clear that commerce cannot exist without transport. Goods must reach the markets It is also clear that transport will not be used unless there are goods or passengers to be carried. In other words, unless the transport " pays," as we say

Again, a business firm naturally wants to dispatch and receive its goods as rapidly and as cheaply as possible, and it will be to the advantage of the transport owner to meet these wishes as far as he can The question of capital and labour we deal with elsewhere. So, omitting this, we can state our three rules of transport as follows—

1 Transport must pay
2 It must be speedy.
3 It must be as cheap as possible.

We will examine each of these in turn.

Transport must pay That is to say, it must be

of advantage to the merchant and to the transporter. The merchant wants to get his goods · the transporting company must make a profit It will not pay any one unless there are goods to carry and trade to be developed. For instance, there would generally be no use or sense in building a railway across countries which are of no commercial value and contain nothing that any one particularly requires. But it is possible that a Government of a country may build a railway, say, which may be of little or no commercial use, but which may yet be necessary For instance, the Australian Government a short while ago completed a remarkable enterprise in building a railway across the desert from Adelaide to Western Australia. They are also thinking of constructing one from north to south across the great desert The French, too, will almost certainly before long build a railway across the Sahara No one supposes that any of these railways will pay from a commercial point of view Yet they will be very valuable because they will link together Empire areas, which are at present to a great extent isolated by reason of the vast stretches of desert

There must, then, be prospects of commercial development before transport can pay, and the converse is true, namely, that commerce cannot develop without transport. Take, for instance, the Amazon Basin of S America, an enormous area some twenty times as big as the British Isles Its vast forests have endless supplies of that most important article, rubber, but the trade is as yet small, mainly on account of transport difficulties The same may be said of other tropical areas such as those of W Africa or the Congo Basin Only a few years ago the cost of transporting rubber sixty miles to the coast in West Africa was £10 a ton

On the other hand, colossal enterprises have been undertaken in order to improve transport conditions

and develop trade, for example, the construction of the Manchester Ship Canal, the Panama Canal and the Trans-Siberian Railway An enormous amount of money was spent, but no one doubts that a great increase in trade must follow in each case, and that the routes will pay in the long run

Now for our second point —Transport must be as quick as possible Goods vary. Those which last only a short time—fish, fruit, milk, for example—must travel quickly. Heavy goods, such as coal and minerals, which do not deteriorate with keeping. can go by slower routes It will pay to send breakable articles, such as china, by canal You will see on a map how the pottery district of Staffordshire is well served by waterways But speed is a great thing in business nowadays. and the firm that gets its goods first to the market will have the best chance of selling them, and will obtain a good name for punctuality and businesslike methods.

A merchant, then, in considering by what route he is going to get his goods, will avoid, if possible. routes on which the goods will have to be transferred, say, from canal barge to railway, or from steamer to rail, several times Sometimes this has to be done, but it should be avoided, if possible, because of the waste of time and the extra cost entailed in the various operations When it has to be done the operation is known as "Breaking bulk"

With the wonderful improvement in labour-saving devices, in motor transport and in aeroplane and airship construction, we shall before long see wonderful developments in the speed at which transport will be accomplished In the spring of 1919 a famous London firm had the latest Paris fashions sent over by aeroplane in order that they might be the first to put them on the market. This is what we call commercial enterprise

But it is not always the quickest way that is the

cheapest Water carriage is cheaper than rail carriage, but it is much slower The general upkeep of a railway is greater than that of a ship, for water does not need constant repair as a railway line does. Moreover, a train-load of, say, twenty-five trucks can carry about 250 tons only, whereas a cargo vessel may carry forty times that amount and at a much less cost.

The payment due for transport service is known as "freight," and is a most important consideration in commerce. The business firm tries to send and get its goods at the lowest cost, and the railway or shipping companies must keep their charges as reasonable as they can or they will lose their traffic Therefore, where there is much transport competition freights will be low.

So, you see, a firm may have to choose between a quick but comparatively dear route and a slower but cheaper one. Later on we suggest a practical question or two on the subject

As carriage by water is, as we have said, cheaper than it is by rail, it is to the interest of railway companies to keep freights low or to offer special rates of carriage for a particular class of article For example, the rates of carriage on grain are lower the greater the quantity sent. Again, rates are reduced for articles such as machinery, glass and china if they are sent at the owner's risk Sometimes special rates are arranged for a group of collieries or for a particular traffic such as the milk traffic.

It should be plain now that the more traffic there is, the less is the cost of carriage, because the more the trade the less has to be charged in order to make a profit Steamship companies, too, have to bear this in mind, for the ships which export goods along a certain route must not come back empty or with only a small quantity of imports Otherwise their voyage will not pay unless high freights are charged on the outward journey.

CHAPTER VIII

THE DEVELOPMENT OF TRADE ROUTES

As we said previously, transport must be either by land or by water. Land-borne traffic must proceed either by road or by rail Water-borne traffic may be carried either on inland waterways or by sea

Further on we shall deal with each of these methods in detail Here we must try to form some idea of how the various trade routes have developed.

In a primitive state of civilization any commerce that exists is carried on as far as possible by road or by rivers. Probably traffic on rivers will develop first because less labour and effort is required to move goods by water than by hauling it along roads, secondly, because water does not need making and repairing as roads do It is worth noting that the two great early civilizations of Babylon and Egypt were centred along great rivers in Egypt and Mesopotamia

Vessels in those days required very little depth of water to float them They " drew " little water, as we say So, possibly, rivers may then have carried a certain amount of traffic which has long since disappeared owing to the increasing size of vessels of all kinds. River-borne commerce would then consist of the products of various groups of villages, often situated in the river valleys or along the river banks, which were exchanged for the in-products of other communities. Thus, the further inland boats could go the better it would be, and ports would be established as far up the rivers as possible. Such ports would be at what we call the limit of navigation

As civilization grew and commerce extended, enough goods would be produced to enable some of them to be exported out of the country Thus the second stage would be reached, and ports would be established as far down the river and as near the sea as possible.

Falls, of course, would always tend to limit navigation But with small commerce and light boats it was often possible to avoid the falls by carrying the boats (canoes, for example) overland for a short distance and launching them again above or below the falls, as the case might be. Such carrying-places were numerous in the undeveloped parts of our early North American colonies and were known as "portages." Nowadays large boats and heavy cargoes cannot be treated like this, and falls have to be avoided by railways or canals.

Even now navigable rivers and lakes carry enormous quantities of goods, and the amount of traffic on such inland waterways as the Great Lakes of North America is truly astonishing

In the early days of commerce, when vessels were small and means of navigation primitive, trade across the open ocean was naturally limited, and voyages were made as far as possible in sight of land Hence arose the great trade routes of the Baltic and the Mediterranean Seas, the commerce of which was largely in the hands of the German "Hansa" or "Hanseatic League," and the republics of Genoa and Venice.

With the advance in nautical knowledge came the discovery of the ocean routes to the West and the route to the Far East via the Cape of Good Hope, discoveries which led to the lessening in importance of the Baltic and Mediterranean as trade routes.

Then the discovery of the uses of steam allowed vessels to take routes largely independent of such things as winds and ocean currents. With the opening of the Suez Canal a fresh trade route became

possible, and finally the construction of the Panama Canal has added yet another

Roads, then, developed as trade routes after rivers The first roads were merely tracks, and in prehistoric times followed the ridges or sides of the hills When much of our land in the British Isles was forest or marsh, it was natural for the inhabitants to avoid these obstacles by keeping to the higher and drier ground

Next, the Romans showed us how to construct much better roads and covered our country and other parts of their vast Empire with a network of them which, though built mainly for military purposes. were doubtless of commercial use, and even to-day form portions of our main roads

The scientific construction of roads came in with the Industrial Revolution of the eighteenth century Thus our road system is comparatively modern, and most of our roads, especially the cross-roads linking up the main systems, are but a thing of yesterday.

Canals, too, belong to the same period They are especially useful in countries where there are large expanses of flat ground and where, in consequence, their construction is easy Some countries like France, Belgium, Holland and Germany make great use of them There are many who think we should follow their example, for though canal carriage is slow, it is cheap

As our commerce increased owing to the Industrial Revolution, there was a natural desire for quicker methods of transport The discovery of the use of steam as a driving power provided the necessary means. Railways were constructed and proved so useful that now all countries which carry on much trade have developed, and are developing still further, their railway systems Indeed. the rapid growth of railways throughout the world has been astonishing; and such is the perfection of modern engineering skill,

that railways of some kind or other can be constructed almost anywhere in spite of obstacles which a short while ago would have seemed insurmountable.

Lastly, we must not forget that the present generation has to reckon with the possibilities of aerial transport. And though the technical difficulties are great and the choosing of air routes by no means so easy as many people imagine, such a means of transport is bound to come in the near future.

CHAPTER IX

THE OCEAN HIGHWAYS

THE following ocean routes are commercial highways —

1 Baltic, North Sea, North and Mid-Atlantic.
2 The Suez route to the Far East
3 The South Atlantic routes, (*a*) via Cape of Good Hope, (*b*) via Cape Horn.
4 The Pacific routes

We shall deal with each of these in detail in the later chapters, but we may here notice that those numbered 1 and 2 are much the most important

In the olden days ships had to take into account not only the amount of trade likely on any particular route, but also the winds and currents Even now sailing vessels, as we shall see, have to do the same, but steamers can ignore the winds and currents to a great extent Nowadays ships have to consider, as well as the above factors. such things as coaling-stations and size of ports.

Vessels on long voyages must be able to obtain fresh supplies of fuel at various points, and if damaged by storm must be able to put in at a port to refit Owing to the great increase in the size of vessels a modern port to be of value must be of a size to berth the largest ships. We shall come across instances where ports have lost trade through not being large enough or deep enough Ports situated up shallow rivers have had to build new docks at their river mouth (Bristol has had to do this), or deepen their

channels as Glasgow has done, to meet these requirements. This means the expenditure of large sums of money, but it pays because trade which would have been lost—as for instance, in the case of Gloucester—is not only retained but may be much increased. It is difficult also to trade with ports which have a "bar" or sandbank at their entrance. The trade of such ports is usually small. The West African ports are good examples of this.

Some ports may be exposed to certain winds and may have to build large breakwaters to enable ships to ride at anchor safely. Madras and Dover have had to do this, and are therefore what is termed "artificial" ports.

Some ports are ice-bound in winter, as are some of the Baltic ports and the St Lawrence ports. Those ports which are up long estuaries are the most sheltered—Sydney in N.S.W., for instance. In fact, there are all kinds and conditions of ports.

We said just now that steamers can choose their own routes independently of winds and currents. So they can in most cases, but dangers from ice and fog have to be reckoned with in high latitudes. The normal or average limits of drifting ice are known and plotted on seamen's charts, and so regular tracks for vessels are taken which avoid this danger. But, of course, icebergs may at any time exceed these limits. The North Atlantic route is a good example of this. In April, 1912, the limit of drift ice was as far south as 35° N. Thus the s.s. *Titanic*, when on the normal steamship route in 41½° N., struck an iceberg and sank with terrible loss of life. Thus even the largest modern liner may not be able to take the shortest route. The route for steamships from Liverpool to New York varies, therefore. It is more northerly from August to January than it is from January to August. Similarly, in order to avoid these ice dangers in the south oceans, a vessel going to Australia will

probably not go further south than 42° S Before long, no doubt, ships' captains will be supplied with some invention which will enable them to detect ice long before they reach it.

Sailing vessels still have to take into account winds and currents just as they did in the days of Columbus, when they often found themselves becalmed in the "Doldrums," or calms round the Equator A useful and instructive exercise is to map out the possible course for a sailing vessel, say, from London to Melbourne or Calcutta and for the return journey With the aid of an atlas showing the winds of the globe, let us see what the course would be from London to Melbourne We can tabulate it as follows, and afterwards draw a diagram of it.

1 The winds will be S W until about 30° N. The ship will be in the "teeth of the wind," as we say, and will have to steer a zigzag course or "tack," just as á cyclist has to do when he rides up a steep hill

2 From 30° N to just beyond the Equator there will be the N E trade winds The ship will have the wind behind her

3 Then she will have to beat up against the S E trade winds, but these will not be so strong as the S W winds, north of the Equator

4 Then about 40° S she will reach the belt of westerly winds or "Roaring forties," as they are called, and she will have the wind behind her all the way to Australia

See if you can work out the return voyage via Cape Horn and note the ocean currents in the South Atlantic

If the ship wishes to reach Calcutta the route will vary according to the season Note how the S W. monsoon is the prevailing wind in summer, when the ship will have the help of the wind all the way, but in winter the N.E. monsoon is blowing, and the

vessel therefore, in order to avoid sailing in the teeth of this wind, will follow the Cape route (already described) to about 100° E, when she will turn and sail N to Calcutta Here, again, you should plot the route on paper and work out the route for the return voyage to London

It is useful, too for a ship's captain to know something about weather and weather maps; he can then tell by watching his barometer, and by noting the clouds and the force and direction of the wind and the temperature of the air, in what position his ship is in regard to a passing cyclone, and what weather changes are likely to follow. Thus he may sometimes avoid dangerous storms, or at least be prepared for them

Trade is carried on either by vessels which follow a fixed trading route or by " tramp " steamers, which go wherever the most profitable cargoes are to be found. We shall learn in the next chapter about these regular " lines " of steamers

As we have seen, some ports are better fitted for commerce than others. Those which do most trade are, of course, the largest ports, but some ports in small islands, or with a small population, may be very important if they lie on the great trade routes The populations of Aden and Las Palmas (Canary Islands) are not large, but these places are very important. The one controls the entrance to the Red Sea (this is what is called " having strategical importance "), the other is a great coaling depot for ships using the Atlantic routes. Moreover, Great Britain could not afford to see the Canary Islands in the hands of an hostile nation, who would then be able to interrupt our food supplies and do much damage to our shipping So, you see, commerce has something to do with strategy. Gibraltar is another important strategical point; so is Mauritius in the Indian Ocean Now that the Panama Canal is open, America would not

like to see the West Indies belonging to an unfriendly power

Again, St Helena and Ascension Island are hardly visible on a map, but are of great value as coaling and cable stations

We may note also that some ports are important because different ocean routes meet there. Singapore and Honolulu (Sandwich Islands) are good examples

Lastly, we must remember that the great trade routes are traversed by submarine cables, so that a great deal of business is transacted solely by means of the telegraph, and that the British Government has projected a scheme for a British Imperial chain of wireless stations stretching from these shores to S. Africa and the Far East

CHAPTER X

THE WORLD'S SHIPPING

In the last chapter we learnt something about trade-routes. Now we must learn more about the shipowners and the actual ships which use these routes.

The world's total of shipping is very large, and consists of various types of ships The huge modern liner, the cargo steamer, the "tramp" plying from port to port, trawlers for fishing, lightships, salvage vessels, cable ships for laying and repairing submarine cables—all these belong to what we call the "mercantile marine," and the men who work on board these vessels are said to be in the "merchant service."

Ships are spoken of, according to their size, as being of so many tons burden The total space occupied by a ship is the "gross" tonnage—and the space in the ship when allowance is made for engine-rooms and living quarters is called the "net" tonnage. According to the amount of cargo a ship can carry, it is said to be of so much carrying capacity Each vessel requires a certain amount of water to float her. This amount of water (in tons) is calculated, and we then say that the ship is of so much "displacement tonnage" and "draws" so many feet of water.

Thus a big liner may draw 35 or more feet of water, which means to say that she cannot anchor in any port or enter any dock which is not at least 38 feet deep. A ship is said to be in "ballast" when she is carrying stuff (say, coal) not for freight pur-

poses but just to make her steady in the water, or "stable," as we say.

In 1913 the world's shipping totalled nearly 47 million tons Of this total the British Empire owned over 11,000 vessels, amounting to 20 million tons That is to say, we owned nearly half the world's shipping So you can understand why it is important for us to know all we can about the mercantile marine

Now a great deal of information can be obtained from a book published by the Shipping Insurance firm in London known as Lloyds This book, which is called *Lloyds' Register of British and Foreign Shipping*, is published every year, and contains—

(1) A complete list of all the names and details of tonnage, etc, of every ship in the world. This portion is in two parts—steamers in one part, sailing vessels in another.

(2) A complete list of the world's shipowners.

(3) Separate lists showing motor-vessels, vessels with cold storage appliances, and ships fitted for using oil fuel

Lloyds also have a staff of expert surveyors to inspect ships if necessary. If after such inspection a ship is found to be in perfect order it is classified in the Register as A1 This is the origin of the expression "A1," meaning "first-class."

Every day Lloyds publish a paper which gives full details of the whereabouts of ships on their voyages, and in order to get from time to time information about the movements of all shipping, they maintain wireless stations and have agents in every port in the world. If you are a shipowner and wish to insure your ship and cargo against accidents on the voyage you can insure them through Lloyds So, you see, this institution is absolutely unique and invaluable to the world's commerce

You should make yourself acquainted with the

names and details of the principal "lines" of steamships and of the routes which they follow. *Whitaker's Almanack* always includes a list of such lines and of the chief shipowners The weekly papers, *The Times Imperial and Foreign Trade Supplement* (2*d*), *Modern Transport* (2*d*) and *The Syren and Shipping, Illustrated* (6*d*) supply endless matter about freights and transport, and contain advertisements of all the chief lines, showing what routes the vessels serve and the ports at which they call If you live at a large port, you will find that the dock authorities publish a weekly list showing the arrivals and departures of all cargo and other vessels at and from the docks. From such a list you can obtain a mass of interesting shipping information. Above all, you should endeavour to *see* the way the import and export trade is carried on at the docks.

The various shipping lines are controlled, as a rule, by companies, because the great cost of modern shipbuilding means that much money or "capital" is required, and one individual cannot be expected to supply all the necessary funds In the pages of *Whitaker's Almanack* we can find a summary of the world's shipping which has been compiled from *Lloyds' Register* From this we can learn something about the great shipping lines. In *Whitaker* for 1913, for instance, is given a list of the seventy-two largest shipowners The British Empire supplies no less than thirty-three names on the list, Germany comes next, and other nations who figure in the Table are Japan, U S A, Netherlands, France, Denmark. Norway is not mentioned, although her mercantile marine is large. This omission only means that her shipping consists mainly in vessels of small tonnage, "tramps," fishing vessels, moderate-sized cargo boats and such like, which belong to many companies or individual owners. If a Table were compiled showing the total tonnage of each country in order of im-

portance, Norway would be high on the list *Whitaker* also gives a list showing the colours of the funnels and the flags of the various lines Ships of course, are built for different kinds of trade. Some carry nothing but cargo (*e g* oil-tank steamers), many carry cargo and passengers The largest liners carry mainly passengers and only a small amount of cargo Such are the great steamers belonging to the Cunard, White Star and Hamburg-Amerika lines, the last-named of which had, before the war, two vessels each over 50,000 tons

In a further chapter we shall learn all about our own mercantile marine. Here we give particulars of a few of the well-known foreign shipping companies —

Line	Country	Head-quarters	No of vessels (in 1913)	Route
Hamburg-Amerika	Germany	Hamburg	431	North Atlantic
Norddeutscher Lloyd	Germany	Bremen	168	N and S America, The Far East, Australia
Compagnie Générale Trans-atlantique	France	Paris	88	Atlantic Routes
Nippon	Japan	Tokio	85	Australia, India, Europe, America, Pacific Coast, New York
Messageries Maritimes	France	Paris and Marseilles	64	India, the Far East, Australia

CHAPTER XI

INLAND WATERWAYS

INLAND waterways are either natural (*i. e.* rivers and lakes) or artificial (*i e* canals and portions of rivers that have been artificially improved).

Whether rivers are useful for transport purposes depends on whether they are good for navigation, and this, in its turn, on various circumstances, such as volume of water, velocity of the current, length and width of river, absence of waterfalls.

Countries which possess long stretches of plain and a constant but not excessive rainfall will have the best traffic-carrying rivers. Holland, Belgium, Germany, Russia, U S A will do as examples of such countries

Notice that there must be *constant* rainfall. Rivers like most of those in Australia and South Africa may be torrents at one time of the year and mere strings of pools at another. Even such large rivers as the Murray and Darling are greatly reduced in volume in the summer months. We said rainfall must *not* be *excessive*, meaning that very heavy tropical rainfall may render a river too swift for navigation. Put in another way, we can say that rivers with only a moderate rainfall but with a short course to the sea may be too swift. Thus a river like the Amazon, which receives heavy rain throughout its vast basin, has the velocity of its current reduced to a reasonable rate, because it has a long plain course before it reaches the sea Hence it is navigable for over 2000 miles for good-sized steamers When the

Amazon Basin is opened up the river will be a great help to commerce

Rivers which descend from plateaux to the sea are, commercially, of limited use There are falls to be avoided where the plateau meets the coastal plain Often the rivers have cut deep-sided gorges in the plateau. Thus navigation may be limited to the region below the falls the rivers are, in fact, rather an obstacle than a help to transport. The rivers of Spain and Portugal are obstructed in this way Of course it pays sometimes to construct canals or stretches of rail to avoid river falls The Welland Canal, for instance, enables ships to avoid the Niagara Falls. The Congo is served at several points by short stretches of rail which avoid the various falls on the main stream. You can understand that, though falls may be avoided in this way, the delay which takes place in transferring goods to the rail and again from the rail to boats greatly lessens the value of the river as a commercial highway

Then we have examples of large and long rivers which might carry much traffic if their lower courses were not ice-bound for so long The rivers of the great Siberian plain illustrate this point.

Now inland water transport is most useful in densely populated manufacturing countries, and it is here that we find canals and canalized rivers greatly developed Holland, France, Belgium and Germany all have excellent waterways. Let us examine them in more detail.

Holland is full of canals which were constructed at first for draining the country, but which are commercially useful for carrying agricultural produce easily and cheaply to the various towns and ports

France in twenty years has spent nearly £26,000,000 in improving her waterways, and all her big rivers are connected up with each other and with the rivers of Belgium and Germany. Thus goods may be sent

from Paris by water via the Marne Canal to Strassburg, or via the Burgundian Canal to Lyons, or by river and canal to the Belgian towns Another canal runs from Bordeaux to Cette, thus forming an inland water-route between the Atlantic and the Mediterranean.

The average canal barge in France carries 300 tons.

In Belgium there is a close network of waterways, and all the principal manufacturing towns in the north-east, such as Liège, Brussels, Ghent, Charleroi, etc., are connected by water with Antwerp, which has thus become one of the biggest ports in the world

In southern Belgium the canal traffic has obviously developed because of the large coalfield extending from Lille across Belgium to Aachen. Other goods carried by these canals are those which are bulky in proportion to their value—building material, such as stone, timber and cement This is a kind of traffic well suited to canals

In Germany the total length of important inland waterways is 6200 miles The large rivers are navigable for many miles. For example —

The Rhine is navigable for 355, the Elbe for 386, and the Oder for 349 miles; while the Vistula, which is only in part a German river, is navigable from the Russian frontier to Danzig, a distance of 153 miles

Large sums of money have been spent on improving the river courses and connecting them with each other by canals Thus the Spree is connected with the Oder, Dortmund with the Ems, the Elbe with the Trave The Rhine is the most important waterway in Germany, and can carry, without any lock on its course, a vessel of 2000 tons as far as Mannheim, and smaller barges up to Strassburg and even to Basle. You should measure the distances on the map from the Rhine mouth to these places

The Main, too, is an important river, and large harbour works exist at Frankfurt and Mannheim.

The group of ports round Ruhrort on the Rhine contains some of the largest river ports in the world.

The average canal barge in Germany carries 500 tons, or about seven times as much as an English barge

In the U S A the Ohio, serving the Pittsburg iron-smelting district, conveys annually a vast amount of coal. The Great Lakes in North America, though they are ice-bound in winter, carry an enormous tonnage of shipping, the amount passing through the Soo locks annually being greatly in excess of the tonnage passing through the Suez Canal in the same time

Canals, of course, have to face severe railway competition, and some governments have found it necessary to protect by law the canals by fixing the railway freights so that they are always higher than those of the canals In this way canals keep their portion of the traffic, and cannot be ruined by railway competition

We must now say a word or two about ship-canals, of which there are four great examples —

The Manchester Ship Canal
The Suez Canal
The Kiel Canal.
The Panama Canal

The first named we shall deal with when we discuss the canal system of our own country Of the other three we select the last named for treatment

We cannot, of course, go into details of its construction These can be found in many publications. The question that concerns us here is in what ways does it and is it likely to affect commerce? You should get an atlas and notice—

(1) The Panama route from Atlantic ports of the U S A. and West Indies to the west coasts of North and South America is shorter by several thousand

miles than the route via the Horn or via the Straits of Magellan.

(2) The Panama route from West Europe to New Zealand is somewhat shorter than the Suez route to New Zealand.

But (3) the Panama route to Australia and the Far East is no shorter than the Suez route

Thus, supposing a cargo steamer is dispatched from a Western European port to, say, Melbourne, which route should she take?

Both routes being practically the same in mileage, it does not matter which is taken so far as the length of voyage is concerned. But there are other things to consider If the ship is fully laden, again either route will do equally well But if the ship has to get cargo, or part of her cargo, on the way, then the Suez route might be chosen, as there would be more chance of picking up suitable cargoes along that route than on the Panama route, which is an out-of-the-way route, as we might say, so far as trade is concerned

Supposing, however, our ship to be fully laden, there is still something else to be considered On either route the ship will have to "bunker" (*i e* take in coal) somewhere on the way Panama and Port Said will be the respective coal ports. If the charge for steam coals at Panama is much less per ton than that at Port Said, then the vessel may be sent via Panama. If Welsh coal at Port Said is less per ton than American coal at Panama, then the Suez route may be chosen. Possibly the same thing might happen owing to differences in canal dues at the two ports

From a general point of view it is clear that a good deal of the carrying trade to the west coasts of North and South America which used to be done by English, German and French ships will in all probability fall into the hands of the U S A merchant service,

because their ports are nearer Panama than European ports But the West Indies should also benefit by the new route

The cost of the canal was very heavy—about £80,000,000—and at present the American Government are spending more on the upkeep of the canal than they are obtaining in charges on the goods and ships using the Panama route In 1917 the expenses were over a million pounds more than the revenue. This, no doubt, is an exceptional state of things, and we see no reason to suppose that the canal will not pay in time from a commercial point of view—at least so far as the United States is concerned As a matter of fact the canal was constructed primarily for naval and strategical purposes, the commercial side of the question being of secondary importance.

CHAPTER XII

RAILWAYS

We have already spoken of the necessity for every country to develop its railways if it wishes to engage successfully in commerce. Except for strategical purposes, railways are built, then, for commerce. The more railways there are, the more will commerce develop. Conversely, if there is to be commercial development, railways must be constructed. It is clear that these two things must go together The whole question of building a new railway is simply a matter of profit—will the line pay from a commercial point of view?

For some countries railway construction may be a comparatively simple matter, for others it is often the reverse Much depends on the supply of labour and capital, and a good deal on the physical features over which the line will pass. Nowadays engineers are prepared to overcome almost any obstacle, and there is practically no limit to the kind of country across which a railway can be constructed—provided, as we said before, that the line will pay.

If we think of the great railways of the world, the following at once occur to our mind —

1 The main route across Europe from West to East
2 Trans-Siberian Railway
3 The Cape to Cairo
4 The Canadian Pacific (C P R).
5 The U S A. railways.
6 Those of the Argentine, Australia and India.

Let us examine some of these in detail, using a physical map for the purpose, and, if necessary, a map showing the density of population along the railway route.

You should in following on a map any railway route alway use a map showing the physical features or "configuration" of the country. It is most instructive to notice how railway routes are affected by the lie of the land Here a railway may follow a valley as far as possible, there it may take a roundabout route in order to have easy gradients Another railway may tunnel through a mountain in order to save time in going a long way round As a general rule, railways are constructed along the "line of least resistance."

A map of Europe will show how the railways are most numerous in the west and much less so in the east. We should expect this—why? Because the west is the most commercially developed part of Europe In other words, the big manufacturing countries are there the British Isles, France, Belgium and Germany

Russia is a vast plain Rail construction should be easy, and there ought to be, therefore, a network of lines over the country. But there is not, because Russia is in a somewhat backward condition and is developing her commerce but slowly.

Note, also, how the Norwegian mountains, the Pyrenees and Caucasus are barriers to railways, but how the Alps are crossed by several lines which make use of the many valleys cutting through the mountains. The lines, you see, converge on three centres in the Italian plain—Turin, Milan, Verona.

Thus the line from France via the Mount Cenis Tunnel makes for Turin; lines following the Simplon Tunnel and St Gothard Pass converge on Milan; the line from Vienna via the Inn valley reaches the Adige valley and Verona by using the Brenner Pass.

You should draw a simple diagram illustrating the above facts.

But these are mainly passenger routes; what goods are carried are likely to be of small size but considerable value Grain from the Black Sea, petroleum from the Caspian region or coal from our shores which is destined for, say, Italy or Greece, will all go by sea It would be far too expensive to send them over the difficult railway routes.

These railways are useful to passengers in steamships from the Far East. They can land at Brindisi, or at Marseilles, and continue their journey by rail, thus saving time and sea voyage.

Supposing we want to travel from west to east—that is, from Paris to Constantinople—we can take the Orient express to Chalons, Nancy, Strassburg, Munich, and so to Vienna and Budapest; thence to Nish, over difficult country to Sofia, and through the easier route of the Maritza valley to Adrianople and Constantinople.

Alternative routes have been proposed for the above journey, but this is the shortest and best way It is about 1660 miles long

From Constantinople we could cross into Asia Minor and travel by the railway which runs through that country, tunnels through the Taurus Mountains, traverses Mesopotamia, and, when finished, will reach Bagdad. Eventually, no doubt, this line will be extended into Persia and will ultimately connect with some line which is in touch with India. On the south it can be connected with the railway crossing Palestine

The question is, will this line pay commercially? You will see that it runs through thinly populated countries, but there is no doubt that Mesopotamia and Persia are capable of considerable commercial development. It is an interesting problem.

Now let us examine the great railway across

Siberia, that vast country of enormous commercial resources. Before the war large quantities of agricultural and pastoral products, and tea from China, were conveyed along this route Some branch lines had been, and others were being, constructed to tap the vast mineral resources of the Altai Mountains and the steppes further west With more of these branch lines the mineral wealth, at present largely untouched, will be made available for commerce.

The question of branch lines "feeding" a main or "trunk" line, as it is called, is an important point. A main line without such smaller and branch lines is like a backbone without ribs It cannot do its full work The Cape to Cairo Railway is in this state at present

Another interesting railway recently completed is that from Petrograd to the port of Ekaterina on the Murman Coast of North Russia This will be most useful commercially because the port is the only ice-free port in that part of Russia Timber and tar should form much of the exports You should try to think why this is probable

Both the Russian railways we have just considered are great engineering feats the one on account of its length, the other because it has to cross great stretches of marshy country in high latitudes.

As examples of what engineering skill can do in mountainous countries, we may refer to those traversing the Andes in South America.

In 1910 a rail was completed from Valparaiso in Chile across the Andes via Mendoza to Buenos Ayres. This is the only railway which crosses this huge mountain barrier.

In Peru there is a railway which reaches the astonishing altitude of 16,000 feet—*i. e* 1000 feet higher than the summit of Mont Blanc. Yet another line runs from Arica to La Paz in the Andes, and reaches 14,000 feet altitude. The object of these

lines is to reach the mines and bring the ore down to the coast Formerly this had to be done by pack animals, such as the llama, and it was a slow and expensive business. So in this way railways have helped to develop the Andean mining industry

In the Argentine and Uruguay the country is very flat; so we find a network of railways, many of which are run by foreign, often British, capital. These lines serve great agricultural and pastoral districts, and convey huge quantities of maize, frozen meat, linseed, wheat and wool to the ports of Buenos Ayres and Montevideo, whence they are exported mainly to European countries.

Much of the U.S.A, also, is plain, and railways abound. There are 266,000 miles of rail in the country. This is far in excess of the mileage of rail in any other country. It is, for example, ten times the extent of our railway system, though we must remember that the U.S.A is more than ten times the size of England

Canada, too, has developed her railways, and the C P R. is a wonderful system which has been the sole means of opening up the great wheat and mining industries of the country This system has 18,000 miles of track; the Company owns over 400,000 tons of shipping, 100,000 miles of telegraph, 18 hotels, and has 10 million acres of land for sale. In 1912–1913 it carried 15 million passengers and no less than 13,000 million tons of goods. It is a colossal enterprise.

You will see that the main line runs from Montreal via Sudbury and the Great Lakes to Winnipeg and Regina, centres of the wheat area; thence to Banff at the foot of the Rockies, over the Kicking Horse Pass (5000 feet), through the Selkirks by the Rogers Pass by a newly-constructed tunnel, the Connaught Tunnel, which saves $4\frac{1}{2}$ miles and 500 feet of climbing, and then down the Fraser Cañon to Vancouver, the terminus.

Starting from Montreal at 10 15 on Monday, the train would reach Winnipeg 10 p m. Wednesday, and Vancouver 8 a m Saturday, having travelled practically 3000 miles.

You should draw a diagram of this route and, if possible, a section across its contours.

India is another portion of our Empire which has a well-organised railway system Much wheat comes by rail from the Punjab to Karachi and much cotton from such places as Nagpur and Berar to Bombay, where it is manufactured and from where it is exported

Australia, too, has about 3000 miles of rail (not counting branch lines) from Queensland to Oodnadatta, near Lake Eyre Branch lines connect the ports on the east and south with the mining and ranching areas Thus, for example, the well-known mines of Broken Hill (N S W) owe their development to this railway which links them with the great smelting works at Port Pirie

In the future we may see a tunnel and rail under the Straits of Gibraltar, a railway across the Sahara; another connecting Ceylon and India, certainly one under the English Channel to the Continent, and links which will make a continuous railway from Canada to Southern Chile. Lastly, some day China will wake up and construct a proper and adequate railway system based on the main line from Pekin to Canton Then Wuchang-Hankow will become one of the biggest junctions in the world, and China will at last develop her vast mineral and other natural resources

QUESTIONS ON CHAPTERS VII—XII

17 What is meant by each of the following terms — Ballast, Freight, Cargo, Insurance, Lloyds, The Mercantile Marine?

18 What advantages has a steamer over a sailing ship?

19 Write a short essay comparing canals and railways as means of transport

20 Draw a diagram showing the railway routes across the Alps mentioned in Chapter XII

21 On an outline map of Europe insert the course taken by the Orient express If you want to reach Salonica from this route, at what junction would you change? What river valleys does the rail to Salonica follow?

22 Measure the length of the Trans-Siberian Railway from Petrograd to Vladivostok, and compare it with the length of the C P R from Montreal to Vancouver, and then with the distance by rail from London to the extreme north of Scotland Represent on squared paper these comparative distances

23 Study a map showing the winds of the North Pacific Ocean Will it be easier for a vessel to sail from Japan to Vancouver or from Vancouver to Japan? Give reasons for your answer

24 How is Singapore better placed for trade than Batavia (Java)? How are the Azores Islands in a better position for trade than the Bermudas?

25 With what countries will the West Indies do more trade now that the Panama route is open?

26 For what reasons would railways across (1) The Behring Straits, (2) Iceland be commercially useless?

27 It is probable that gold exists in the Antarctic mountains What things would have to be taken into account before commencing mining operations?

28 What physical difficulties would be met with in opening up Persia by railways? What other form of transport might be used?

29 Describe with the aid of a map showing physical features and contours —

(*a*) The kind of country traversed by the C P R

(*b*) The connection between physical features and railway routes in (1) the district in which you live, (2) in some foreign country—India for example

CHAPTER XIII

POPULATION AND COMMERCE

POPULATION is measured by finding out how many people inhabit a square mile of land, and it is expressed on paper by maps showing the density of population.

Obviously there are many reasons why countries should differ in the number of inhabitants they contain Here we are concerned with the question as to how commerce affects or is affected by population.

If we look at a map showing the distribution of population in the British Isles and compare it with a map of the coalfields, we are at once struck with the fact that the population (excluding the London area) is densest round the great coalfields.

If we were to take other great coal-producing countries, we should find the same conditions Let us remember, then .—Population is densest near the coalfields, or, in other words, (1) Population is densest where there are most manufactures—*i. e* most commerce. This is our first point, and we label it (1).

Next we know areas where there is little or no commerce. The cold tundras, the great deserts, the great tropical forests Does the population map show any peoples in these regions? No. Here is a second point therefore —

(2) Little commerce, little population.

We know, on the other hand, parts of the globe which are particularly fertile—deltas of rivers,

especially of tropical rivers We shall expect to find a large population in such areas, and the map shows that this is the case. For example, population is dense in the Nile Delta and throughout the monsoon region of Asia, which contains many large deltas.

Now deltas do not produce coal · they are not manufacturing areas. But their soil is most fertile, and large crops (of rice, for example) can be raised with very little trouble The population will be an agricultural one, and in tropical deltas will be a native population, because other people cannot stand the hot and wet climate.

The coalfields, situated as they are in a more genial climate, may attract people of all races, so that the population becomes very mixed. The population in the great coalfields of the north-eastern states of the U S A. is composed of all nationalities. We can summarize all this as our third point by saying—

(3) The great deltas, especially those in the tropics, produce a dense agricultural and largely native population.

Next let us take the case of the great grasslands. Here agricultural, pastoral and hunting pursuits are followed. Large farms can be managed by comparatively few people, large flocks tended by even fewer, hunting requires fewest of all.

So we may say (4) The great grasslands are thinly populated

(5) High mountain ranges and bleak plateaux, like that of Tibet, for instance, also support but few people. But the "piedmont" belt—*i. e.* the country at the foot of a mountain range—is often well populated

Here and there mining centres may develop, or a fertile valley support a good many people, but, taken as a whole, population is bound to be scanty.

(6) Where a country is largely mountainous popu-

lation will tend to gather on the coastal plains—*i. e.* if the country has a seaboard.

Certain types of places must always attract population Such are—

(*a*) Ports, (*b*) rail and road junctions; (*c*) river valleys, (*d*) places with special natural resources or advantages—*e. g.* health resorts, mining centres.

The first three are all intimately connected with transport and communications Thus we again see the close connection between transport and commerce

Mines must mean commerce, but it may be only for a time. Sooner or later they are bound to be worked out. Thus we ought to look upon such places as possessing a temporary population. The same thing applies even more to health and pleasure resorts, where the population is always changing and is largely seasonal

From all we have said it should be clear by now that population and commerce are closely related, and that you must have a certain—*i. e.* a sufficient—number of people before commerce can begin. Many areas of the world are commercially undeveloped largely for lack of labour. Sufficient money, or "capital," can nearly always be found for commercial development, but the supply of labour is often a difficult problem. We shall study the question more closely in the next chapter.

CHAPTER XIV

CAPITAL, LABOUR AND COMMERCE

In this chapter we must try to form a clearer idea of the way in which the subjects which form the heading are dependent on one another.

We must be clear as to what is meant by capital. Usually it is taken to mean money, and so it often does. But it means more It is only another way of saying resources. Thus, when we talk about a nation's capital we really mean a nation's resources—that is, we include under this term not only money but the whole national stock of commodities that may be of value commercially. Machinery, tools, factories, forests, water power—all are capital.

When we talk of a man setting up in business and needing so much capital with which to start his trade, it is then that we mean money. But we must be quite clear that once he has started, bought his necessary machinery, erected his workshops, and so on, all these things become so much further capital, and can be used to develop his industry

It is obvious that some nations must possess advantages in resources over other nations, and that one individual may start with more capital than another. Yet it is the way in which the capital is used which will determine which nation or individual will ultimately succeed.

You remember the parable of the talents in the Bible One man did nothing with his money—that is, he kept it safe, but lying idle; the others invested their talents and made interest on them. They were all in possession of capital; one man left his

capital idle; the others put their capital to commercial uses.

In commerce enterprise is a most valuable thing For long our merchants have been enterprising In this way we can explain the large amount of British capital in the form of investments, factories and other business concerns which are in foreign countries.

Now a country may be rich in one kind of capital (natural resources) but may lack another kind of capital (money) to develop them. In such a case the nation borrows money from foreign countries, who in this way develop the commerce of that country.

But countries cannot always borrow If the conditions of government of a country are unsettled, people will not invest their money in that country. In other words, that nation cannot borrow capital, and her trade will accordingly suffer. Mexico, the South American states of Bolivia, Venezuela, Colombia and Peru, for example, all have considerable natural resources. But the governments in these states have been so changeable, revolutions and social disorders have been so frequent, that foreign capital has been frightened away, enough has not been forthcoming to develop their trade, and the result is that to-day these nations are commercially backward. On the other hand, the Argentine, Brazil and Chile have had settled political conditions for some years now, and the effect is seen in their vastly increasing commercial importance

In places like Bolivia and Peru, where a large portion of the country is very mountainous and transport most difficult, much money will be needed to build railways and open up the region. Conversely, in very fertile agricultural areas, such as the Asiatic monsoon countries, very little capital will produce great results. A coco-nut plantation wants comparatively little money expended on it, but it yields good profits

Natural capital in the form of forests useful for,

say, lumber or rubber, must not be used up recklessly. The natives in West Africa, for instance, are very careless in the way they tap the rubber trees, with the result that they kill many valuable trees which would last longer and yield much better rubber if scientifically treated Our own woods have been treated too carelessly in the past. Much woodland has been ' deforested," and there has not been enough planting of new trees—" afforestation," as it is called

From all this you can see that, though we have capital, we must use it properly, *i e* capital must be organized

Trading firms and business houses nowadays pay large salaries to people who can organize well So it comes about that the capital of large companies is represented by the money of the shareholders and the equipment that money will buy, whereas the actual business is ' run " by the organizing people—that is, the directors of the company

But note that, important as capital is, it cannot by itself create commerce. Labour must be called in to help it It does not matter how rich a country is in, say, mineral wealth; it does not matter how much money there is to develop the mining industry, if there is no labour to work the mines and to transport the produce, no commerce will result.

The question of labour, then, is most important, and, as we indicated in the last chapter, often a very serious one. Australia's population is only as large as that of London, although Australia itself is sixty times as big as England Thus much of the country cannot be made commercially useful until there are more people to supply the labour market. Canada is in a similar position; so is Siberia. In such countries there is naturally a great demand for immigrants, who are encouraged by the governments by being allowed land either free or on very easy terms of purchase.

Even if you can get enough labour, it must be of the right kind We mean that it must not be too dear and that it must be able to produce enough goods to make a commercial success of any enterprise on which it may be engaged

Naturally, labour is not the same price everywhere Chinese or Japanese coolies will work for a daily wage which is equivalent in our money to something less than sixpence This they can do because they live very cheaply and exist largely on rice, which is a very cheap crop to grow

On the other hand, the standard and cost of living in Great Britain and the U S A are becoming higher every year This is a serious matter At the present moment Japan is manufacturing large quantities of silk and cotton goods at a very cheap cost of labour, so cheap, in fact, that she can sell the goods at a low price, with which our manufacturers, who have to pay dearly for their labour, cannot compete. Thus a firm which wants quantity rather than quality will purchase the inferior but cheaper Japanese articles instead of the superior but dearer British goods

This cheap labour, as we have noticed before, is largely used on tropical plantations of sugar-cane, tea and coffee, etc And it is a great question as to how far such labour must be and should be employed. The north of Australia, for instance, is a rich but undeveloped tropical area The Australians say they will have only white and not coloured labour The question is, can the white man work in that climate? If he cannot, then either coloured labour must be imported, or so much commerce must remain undeveloped

By this time you should have formed some idea of how essential to commerce are labour and capital together, and how trade is handicapped when one is present but the other absent.

CHAPTER XV

THE MACHINERY OF EXCHANGE AND DISTRIBUTION

We want in this chapter to examine the methods of importing and exporting from a practical point of view The various transactions that have to be performed are really somewhat complicated We shall therefore not go into full details but endeavour to make the facts as simple as possible

Let us suppose that a Bristol firm, A, has 200 tons of galvanized iron for shipment to a French merchant, B, at Marseilles

When the goods are actually ready to be dispatched, the local shipping office is notified by A, and they inform A when the goods are to be delivered to the wharf at which the ship is berthed When the iron has been duly brought to the quay a receipt is given by the representatives of the shipping agents, and on production of this note the owners of the vessel or their deputies will issue an "Original Bill of Lading," which is the official document acknowledging that the galvanized iron has been shipped on board the vessel.

A copy of this bill of lading will be kept at Bristol by the agents, and the original bill will be forwarded to B at Marseilles On the arrival of the vessel at Marseilles docks, B will present the bill of lading to the shipping office there, and will receive in exchange a "Delivery Note" authorizing the removal of the goods provided that all charges or payments have been exacted. Let us see what these charges are They will be —

1. Freight, *i e* payment to the shipowners for shipping the goods.

2. If the goods are dutiable, *i e* liable to customs duty, the customs officers at Marseilles will see that the duty is paid before B can take away the goods from the docks

3 Dock dues, which will be a charge of so much per ton (in this case so much on the 200 tons of iron) levied by the dock authorities at Marseilles

4 Landing dues, which are the cost for unloading the iron out of the vessel and which will go towards paying the dockers employed in the unloading

When all these transactions are complete, B will be able to transfer the galvanized iron from the docks to wherever he may want it

There are, however, several other points about the exchange and distribution of goods which are of much practical importance, namely—

Handling of goods at the docks
Advertising and obtaining markets for your goods.
Packing

Let us examine each of these in turn.

The handling of goods at docks is one of the most important things in transport. Every dock should be furnished with all kinds of labour-saving machinery which saves, also, cost and time Grain, for instance, is unloaded by various mechanical contrivances which convey the grain direct from the ship to store-houses known as "silos" Again, by ingenious kinds of cranes, goods can be removed direct from the ship's hold to the place of storage and can be automatically weighed while being so transferred

A great deal of time is lost by shunting of railway trucks Here, too, difficulties are being overcome by using electrical contrivances which can pick up a whole truck and move it in any required direction.

In some ports there are parallel tracks (sometimes overhead) for cranes which enable several cranes to unload one wagon, thus saving much time. Large ports are being provided with much more space for discharging and loading than formerly All this makes for the speeding-up of commerce

Now for our second point—

If you want to get a market for your goods you must advertise. Even if a firm has been before the public for many years, it must continue to advertise, or it will see its profits dwindle

Some nations are very attentive to this point. The Americans and Germans, for instance, take endless trouble in seeking fresh markets Some British firms are very enterprising in this respect, whereas others might with advantage do a great deal more to " push " their wares Catalogues should be attractive to look at, well printed and well illustrated. The men we call commercial travellers, who are sent out by firms to advertise their goods, may, if they are sharp and businesslike, obtain many orders

Say a British firm wants to open business with South American firms It will be most advisable, perhaps essential, to have the catalogues printed in Spanish, and a traveller who can speak Spanish

Again, when there are important international trade exhibitions, businesslike firms make a point of sending to them attractive exhibits of their goods showing the various kinds they can supply for different countries' markets In this way many orders for their manufactures may be obtained.

Now take our last point—packing

This may seem to you an unimportant detail. On the contrary, great attention should be paid to it Shipping firms should procure from their customers or from their own travellers and agents full information about this important item, for good packing means less risk of damage to the goods, less cost and avoidance

of unnecessary trouble and labour. In the number for March 29, 1919, of the weekly paper *Modern Transport* appeared a very interesting article by an American expert on "packing goods for shipment." He shows that American firms have found, for instance, that machinery destined for the west coast of South America must be packed in a different way from that which is intended for the east coast of that continent And for this reason countries (such as Peru) on the west coast are still undeveloped commercially and have but poor dock, harbour and pier facilities. Hence, as there is little in the shape of labour-saving devices, packages must be as small and as light as possible. Heavy machinery, therefore, must be taken to pieces and shipped in parcels of small dimensions and put together only when the final destination, which may be even as far as the east side of the Andes, is reached.

Again, boxes for India should be coated with coal tar to keep out the "termite," a species of ant, which makes its meals of wood and can demolish whole packing cases in a very short time. Fine goods such as silk should be in tin or zinc-lined cases, woollen goods should be "pressed" so as to reduce the bulk and thereby save much freight where the charge is levied according to the size of the package All articles should be packed in some waterproof material.

In general we may say, then, that the packer should aim at getting the goods to the customer (1) without breakage and, in the case of machinery, without rust; (2) as quickly as possible; (3) as cheaply as possible.

QUESTIONS ON CHAPTERS XIII—XV

30 Refer to a map showing the world's density of population What areas within the tropics are uninhabited? How do you account for this? What areas between 0° and 23½° S are thickly populated? Are they

coalfields? If they are not manufacturing regions, how do you account for their population?

31 How do Canada and Australia resemble one another in density and distribution of population? Explain why this should be so

32 Why does the population of Norway and Sweden gather in the south and south-east?

33 Account for the dense population of China proper and the scanty population of Tibet

34 Explain the distribution of population in the East Indies

35 Write an account of how in your opinion a tropical island like Borneo might be opened up to commerce

36 What are the chief industries of the district in which you live? For what reasons do you think they have been established there?

PART II

THE BRITISH ISLES

CHAPTER XVI

CLIMATE AND PHYSICAL FEATURES

FROM our previous study of climate we shall remember that our islands are situated in the temperate zone and in the westerly wind belt This, of course, is a good thing for us, as it is never too hot in summer to work, and the temperature in winter is seldom severe enough to interfere with commerce Yet, if we come to think of it, it is astonishing that our climate is not more severe in winter Consider our latitude The British Isles extend roughly from 50° N to 60° N. Yet few of us probably realize that our most northerly point is on the same line of latitude as the south of Greenland, or that we are actually nearer to the North Pole than we are to America. Measure the distance between the Shetland Islands and Spitzbergen, which is only some 700 miles from the Pole, and you will see that a steamer could reach Spitzbergen from our shores in three days Or to take another example. Quebec is 5° further south than the Bristol Channel or Thames estuaries Quebec is not a winter port, as it is icebound, yet Bristol and London can be used all the year round

Riga on the Baltic coast is ice-bound, too, in winter, but Dundee, in the same latitude, is not Consider what an enormous loss of trade would result if our ports were ice-bound during the winter months.

So you see it is very fortunate for us that we are in the track of the warm Atlantic winds There are

people who tell us that the warm Gulf Stream washes our shores and keeps our climate mild; but we know really that it is the warm, moisture-laden westerly winds that are responsible for the very mild winters of N.W. Europe. Latitude has little to do with the winter temperature of the British Isles. What mainly decides the winter temperature of a place in our islands is its nearness to the westerly wind influence. Thus our winter temperature depends rather on longitude. You should look at a map showing the course of the January isotherms over the British Isles, you will see then that the islands to the extreme north of Scotland are actually as warm in winter as the Isle of Wight

Let us sum up what we have been saying:—

(1) Our climate in winter is much milder than we should expect

(2) The commercial advantage of this is that our ports can be used all the year round

The westerly winds which reach our shores find their path barred by the mountains of Ireland, Wales, Scotland, Cumberland and the Pennine range, and so are forced to ascend into cooler regions where their moisture is condensed into rain. Thus the west side of our islands is wet and the eastern side is considerably drier and cooler too, for we must remember that when rain falls a certain amount of heat ("latent heat," as it is called) is set free. On the whole we shall not be far wrong if we say that the west of the British Isles is more rainy and more temperate in climate than the eastern counties. These facts will, as we know, have an effect on the growing of crops Wheat, for instance, which requires a warm, dry summer. will flourish best in the eastern counties We shall learn more about this later on.

Rain is important for commerce in other ways.—

(1) It gives us a good water supply either in the form

of rivers or springs A line of springs often determines the position of towns or villages—*e g* at the foot of the Mendips or North Downs

(2) The rivers are used for transport and for motive power—*e g* they can be used for generating electricity and so running factories Thus many of the Scottish rivers which have falls on them may become commercially useful

(3) Pure water supply is important in certain industries such as brewing or dyeing

(4) A damp climate is absolutely necessary for cotton spinning This explains the cotton manufacture of the Lancashire towns So we may say that thousands of people in Lancashire depend on the rain for their wages, and as it is calculated that £10,000,000 in wages are paid annually to the cotton workers, we can see of what commercial importance rain is

We thus have two more important natural advantages .—

The mountains cause rain and the rain is of great use to commerce

Mountains, then, are useful, but they have their disadvantages as well They make communications difficult and they may not be suited to the growth of useful vegetation There are miles of barren moorlands in the Irish and Scotch mountains and on the Pennines, which are at present commercially useless The same may be said of marshy or boggy lowlands such as those in the central plain of Ireland.

Of course, with the great advance of modern engineering skill, railways, roads, and even canals can be constructed across mountain ranges For instance, the Pennine Range is crossed by several But wherever there are gaps or passes through the mountains they are used for the purposes of communication, because it is much cheaper than constructing railroads and tunnels over or through the mountains.

As a rule the gaps through the mountains have been caused by rivers, so here again you see how rain may be of use indirectly

In the British Isles we are fortunate in having many useful gaps which are most important in determining the transport routes and the sites of towns You should find on your map the chief gaps You will notice that as a rule there is a town at each end of a pass Some of the important gaps and towns are given below, but you can find many more and should work out the questions given on the subject at the end of the chapter

Gap	Towns
Tyne	Carlisle—Newcastle
Aire.	Skipton—Leeds
Glenmore	Fort William—Inverness
Thames	Wallingford—Reading.

Later on you will learn the railways and canals using the gaps and the areas they connect. For instance, the Tyne Gap connects the east and west coast routes to Scotland, the Aire Gap connects the manufacturing districts of Lancashire with those of Yorkshire, and so on.

We have still to notice one more most important natural advantage that the British Isles possesses—namely, our rugged coastline, which is cut into by long estuaries, thus allowing vessels to penetrate well inland and making communications easier.

QUESTIONS ON CHAPTER XVI

37 Draw a diagram showing the gaps through the North and South Downs Notice which are river and which are dry gaps Put in the towns which control each gap

38. What canals use—

(*a*) Glenmore,
(*b*) Aire Gap?

Why do you suppose the canals were made? Which of them will have the greater goods traffic? Why?

39 Find four ranges of hills which cross the Central Plain of Scotland What are their names? Draw a diagram of them, the gaps, rivers and controlling towns between them

40 Discuss the advantages for commerce afforded by the position of the British Isles

CHAPTER XVII

NATURAL RESOURCES OF THE BRITISH ISLES

In the last chapter we discussed some of the advantages we derive from our position as an island and from the physical features of our country. We must now examine in some detail our natural commercial wealth

We will group the natural resources as follows :— animal, vegetable and mineral

Subdividing them we get .—

1 Fishing
2. Natural fertility of the soil. Timber
3 Minerals Rocks commercially useful

We can omit "fishing" as we shall deal with it in a later chapter, and we shall not consider coal and iron in any detail, as these also will be fully treated when we come to consider manufactures.

We will begin, then, with the points under the heading 2.

In the United Kingdom the amount of land which cannot be put to serve any useful purpose is small— say about 10 per cent Most of our country is good either for agriculture or pasture. The most unproductive areas are —

(*a*) Mountain areas like the "deer forests" of Scotland, and a good deal of the moorland in West Ireland and Wales The Board of Agriculture in their statistics call this kind of country "mountain and heath."

(*b*) The stretches of "bogs" in the centre of Ireland

—though even here peat is of some commercial value as a fuel

About 5 per cent of our land is covered with woods. Years ago the British Isles were well forested. We know from history the names of some of the forests—the Weald of Kent, Sherwood Forest, the Forest of Arden, and so on. You should look at a map showing the British Isles at the time of the Romans. Even now we can find on a map in any good atlas the names of Epping Forest, the Forest of Dean and the Weald

Shipbuilding, however, and iron-smelting when charcoal was used for this purpose, seriously reduced our timber supply, and it is only of very recent years that we have begun to realize that our home-grown timber supply needs careful supervision No doubt a considerable proportion of the land could bear forest, and something has been done towards a certain amount of "afforestation," but much more might be done with careful and scientific work

After all, timber is an indispensable article of commerce (though one which is very bulky and awkward to import); we need it for so many purposes · *e g* for (1) building and construction of all kinds; (2) pit props for the coal mines, (3) wood pulp for paper making, (4) wood blocks for paving roads.

Of course, we still obtain a certain amount from our own woods, but the greater part of our timber supply comes from abroad Large quantities of pit-props come from Norway, Sweden, Russia, France (Gascony), etc, and are shipped to Newcastle, Hull, the Bristol Channel ports, etc

Wood blocks for paving are largely made from the Australian hard woods Jarrah and Karri—you can tell the wood by its reddish colour. Teak in large quantities is imported from Burma, India, Java, etc, and is used in shipbuilding and railway construction ("sleepers" etc) Greenheart for pier piles comes from British Guiana, fir poles (for masts, etc) from

British Columbia and the U S.A. The flagstaff in Kew Gardens, London, which is 235 feet in length, is a "Douglas fir" which was shipped over here in 1916 and was then towed up the River Thames to Kew. Hard woods for cabinet-making come from the tropics, and wood pulp from Newfoundland, Norway, etc

We said just now that wood is a very clumsy article to import because it takes up so much room It is therefore very interesting to note that early in 1919 the experiment was tried of floating timber over here from Norway. By floating we mean, of course, that the timber was in the form of a raft and was towed here by tug The raft contained 4760 tons of timber, or enough to fill five ordinary timber steamers, was 360 feet long and 42 feet wide. It left Trondjhem in Norway on March 22nd, and, allowing for delays of various kinds, took nineteen days to reach Ipswich docks. It was manned by five men and required one tug for towage purposes. Now you see that the method, though slow, was commercially a success, because it was cheaper than sending the timber by cargo steamers, and for these reasons. (1) ship-space was saved, (2) payment of freight was saved, (3) there were only two crews to be paid instead of five.

Of course, such a method of transport would not be possible in rough weather; nevertheless its development will be watched with interest.

We now come to our third division, minerals and rocks. We shall treat the more important of these in detail in a later chapter. Here we can notice only a few points of general interest.

With the exception of coal and iron our mineral wealth is not great; but the following should be noted.—

1 Salt deposits in Cheshire (Nantwich, Middlewich, etc), Worcestershire (Droitwich) and Durham county.

2 Tin mines in Cornwall Wolfram also obtained in this county

3 "Kaolin" or "china clay" deposits are worked in Cornwall at St Austell and other places, and the product is exported from Fowey, etc, to the Staffordshire pottery district You should consult the map and see how far the Mersey estuary is away from, say, Hanley, and consider by what route the clay will reach this town

4 Zinc is mined in Denbighshire and Flintshire.

5 Small deposits of lead and copper are mined in such areas as the Isle of Man, Flintshire.

But, as we said, our mineral resources have to be largely supplemented by imports from abroad

We deal with coal and iron elsewhere, but we may as well here point out the principal coalfields With the help of a geological map you will see that the coalfields can be grouped as follows —

A South Wales, Monmouthshire, Forest of Dean, Bristol and Somersetshire

B The Midland coalfields, *i. e* Staffordshire, Warwickshire, Leicestershire, Shropshire and South Derbyshire

C North Wales, Lancashire and Cheshire

D Yorkshire, Derbyshire and Nottinghamshire.

E Durham, Northumberland and Cumberland.

F Scotland Lanarkshire, Ayrshire, Fifeshire and Midlothian.

G Ireland (unimportant)

As regards rocks which are commercially useful we may note—

1 Slates from the quarries of Bethesda, Llanberis and Festiniog in North Wales Some also from the Lake district, Ireland and Scotland

2. The granites, owing to their hardness and weight,

are specially suitable for such construction as bridges, lighthouses, dock walls, breakwaters, etc

They vary very much in colour and in texture. Sometimes they are grey or whitish, at another time they may be reddish or pink (as in the Aberdeen granites).

Some of the best known varieties are those from Aberdeen and Peterhead in Scotland, The Mourne Mountains, Wicklow and Wexford in Ireland, Cornwall (Liskeard, Bodmin), Leicestershire, Dartmoor, North Wales

3 Sandstones and limestones of all kinds are extensively quarried for building purposes The oolitic limestones which form the Cotswolds and other hills, and stretch from Dorsetshire to the Yorkshire moors, are much used If you travel through the Cotswolds you cannot fail to notice how the houses and churches are built of this stone Even more striking is the general use of stone walls instead of hedges Some kinds of this stone are particularly easy to cut when freshly excavated, the "freestone" of Bath is a well-known variety of this kind "Gannister," a kind of sandstone, is used as a lining for furnaces.

4 The clays are used for brick-making and for tiles and drain pipes

Peterborough is a very important centre of the brick-making industry

In addition, there are many other rocks used for all kinds of purposes. Sands for glass making; flints for road-making and porcelain glazing, chalk for cement, quicklime for agricultural purposes, marbles for building and ornamental purposes, ochre as a colouring material, and so on

Our islands can supply us with all these; it is one of the advantages which arise from the fact that the rocks which compose them are of all geological ages.

CHAPTER XVIII

OUR SEAPORTS IN GENERAL

Our country is particularly well off for seaports, it is well situated for trade with all parts of the world, its coast line is cut up by long inlets and estuaries, and there is no place more than seventy miles from the sea It is not surprising, then, that our ports are many But the size of them varies greatly according to their natural advantages and other factors which it is our purpose to inquire into in this chapter.

We may safely say that the bigger the trade the bigger the port But it does not follow that if a port were to be enlarged to a certain size it would necessarily attract much trade It would depend largely, as we have learnt before, on the country and communications behind the port. We shall see that most of our great ports are connected with large coalfields and manufactures, and that ports that are "out of the way" and not well placed for trade must suffer. There is a most instructive example of the way in which ports do or do not develop It is worth while to examine it in detail

In South Wales there is a long irregular-shaped estuary, which in Norway would be called a fjord, known as Milford Haven You will see on a map that it is in Pembrokeshire and that a port, Pembroke Dock, is situated on it The harbour is sheltered, large and deep; moreover, it faces west. There ought to be, one would suppose, a large port there. The harbour is known to be one of the finest in the British Isles; it is well placed for trade with Ireland

or America: the port ought to rival Cardiff or Bristol, yet it is hardly used. The Government have a naval dockyard there where a few torpedo-boat destroyers or perhaps a light cruiser may be built—but that is all. Not so long ago the Channel Fleet used to put in there and use it as a base during manœuvres. Now this port might be enlarged to any extent but it would never attract trade. Why not? Simply because the country behind it lacks resources because the port itself is in an out-of-the-way corner of Wales and is not on the line of trade routes. Here is a fine natural harbour going begging. Now follow the Pembrokeshire coast round and you come to Fishguard—a port of the "artificial" sort—and we have learnt what that means. Yet it is more flourishing than Pembroke Dock and has become of considerable importance during the last few years. Why? Because from it one of the shorter crossing routes to Ireland can be made—measure the distance between Fishguard and Rosslare. But this does not explain it fully. Its growth has only been marked since the G.W.R. made it their terminus for the route to South Ireland. As a matter of fact it has lately become the port of call for the large Atlantic liners returning to Liverpool from America, and passengers for London can land at Fishguard and proceed to London by rail instead of voyaging to Liverpool and going by rail from there. So you see we have illustrated the following important principles:—

(1) It is the trade that makes the port.

(2) A port off the main trade routes is at a disadvantage.

(3) Commercial enterprise may make an artificial port more important than a port with great natural advantages.

We could find many other estuaries and bays on the west coasts of the British Isles which would make

fine ports, but they would be, like Pembroke, without trade because they have a bad "hinderland' Look, too, at the number of ports on the Devonshire and Cornwall coasts Falmouth and Fowey, Newlyn and St Ives, Kingsbridge and Dartmouth, and so on Many of them were important in the days of Elizabeth, and sent contingents of ships to the Navy So did the Kentish ports in the days of the Normans The history of the "Cinque Ports," as they are called, is most interesting and you should read about it. Nowadays we have little use for these ports from a commercial point of view They may have trade in fish or china-clay or tin, etc, but the trade is mainly local, the ports remain small Perhaps they have been "silted up"—some of the Kent and Sussex ports have been, but this is not the real explanation Coalfields, manufactures, these are the essential things, and ports without them must remain obscure

We will make a list of our large ports—here are some Cardiff, Newport and Bristol, Newcastle and the Tyne and Tees ports, Glasgow, Leith All these are actually on coalfields, Hull and Liverpool are close to coalfields London and Southampton are somewhat exceptional, we shall deal with them later on Let us group the ports in four great classes.—

I Ports which are outlets for the coalfields—

(*a*) South Wales ports-

(*b*) Pennine and N E coalfield ports—

(1) East coast, Tyne and Tees ports, Hull, Grimsby

(2) West coast, Manchester, Liverpool.

(*c*) Scottish coalfield ports—

(1) East coast, Leith

(2) West coast, the Clyde ports, Ayrshire ports

(*d*) Cumberland ports

II. Ports of mainly local importance—
  (*a*) Fishing ports
  (*b*) Those dealing with minor local products, *e g* china-clay

III Naval stations.

IV Ports dealing with cross-Channel traffic—
  (*a*) Packet stations for Continental traffic
  (*b*) Packet stations for Ireland.

The last named group of ports are dealt with in Chapter XXIII In the next chapter we shall examine more carefully the ports in Groups I–III

CHAPTER XIX

OUR SEAPORTS IN DETAIL

In this chapter we are going to see how the groups of ports which we mentioned in Chapter XVIII have acquired their importance We will take them in groups first and obtain a general idea of the reasons for their growth, and then we will deal more carefully with one or two ports which we shall select for the purpose

It must be understood (1) that we cannot in such a small space deal fully with such a big subject and that we have selected only the most important facts; (2) that constant reference to maps showing coal-fields, communications and physical features must be made by the student, (3) that questions in the text will occur from time to time and these the student is expected to answer for himself Lastly, we have written the chapter more in the form of notes so as to economize words and make the facts stand out clearly. The most important facts are in italics

Group I.—(*a*) *The South Wales ports*—Coal either for *export* (Cardiff anthracite) or *smelting* Cardiff, our greatest coal-exporting port Swansea and Newport, zinc, tin-plating and copper smelting, ores imported from abroad, largely from Spain and the Malay Peninsula. Bristol, mainly an importing port, trade with West Indies Main G W R. line from London to Fishguard (via Severn Tunnel) passes through Newport and Cardiff

(*b*) 1. *Tyne and Tees ports*—Coal, iron, lime-stone, therefore *smelting* (Middlesborough, etc.); coal

also used for (1) *shipbuilding*, (2) *export*, mainly to London.

Rail connection N E main line to Scotland Also connection with Carlisle via Tyne Gap across the Pennines.

Hull and Grimsby—Opposite the Dogger Bank, therefore *fishing* ports Hull is outlet for *woollen* manufactures of Yorkshire.

All these ports trade with Scandinavia and the Baltic G C R. has built large new docks at Immingham Served by N.E R, G C R., Hull and Barnsley Railway and by good canal system

(*b*) 2 *Liverpool and Manchester*.—Outlet for *cotton* manufactures of Lancashire, great import of raw cotton from America and also of grain from Canada and U S A, all kinds of dairy produce, meat, hides from North and South America; outlet for salt, chemicals and glass of Northwich, Widnes, St Helens, Runcorn, Warrington (Tanneries here, why?), shipbuilding at Birkenhead L N W R connections with main line at Crewe (London to Scotland) G W R (from Birkenhead) through trains to (1) London via Birmingham and Oxford, (2) Plymouth via Bristol

N B—(*a*) Manchester Ship Canal, (*b*) Tunnel under Mersey, Ferry over Mersey, connecting Liverpool and Birkenhead.

(*c*) *Glasgow*—Iron and coal, *shipbuilding*, outlet for *cotton* goods of Paisley, machinery, etc Connections with Grangemouth and the Forth by canal, with Carlisle and the South by the Glasgow and S W R, with Edinburgh and Stirling and the North by the N B R Ayrshire ports export coal to Belfast. Trade with America Imports sugar, cotton, timber, etc.

Leith.—Port of Edinburgh, on coalfield; outlet for paper manufactory of Edinburgh and for woollen goods from Galashiels, etc. Trade mostly with North Sea and Baltic ports

Group II —Two main divisions

(*a*) Fishing ports —Whitby, Scarborough, Yarmouth, Lowestoft, Grimsby, Hull, ports of Cornwall, most of Irish ports (only small local trade) Scotland Aberdeen, Wick, Lerwick, Peterhead, Fraserburgh, etc

(*b*) Ports with special local industries —Aberdeen, exports granite, Dundee, exports manufactures of sailcloth, bags, ropes, etc (jute and hemp imported from India and East Indies), Fowey, exports china-clay to potteries via the Mersey and Weaver Rivers

Group III Naval Stations —Berehaven (South-west Ireland), Scapa Flow (Kirkwall, Orkney Islands), Rosyth (Firth of Forth), Cromarty, Plymouth (ship-building), Devonport, etc.

Southampton is somewhat exceptional because it has no coalfield or manufacturing district behind it, and yet is very important commercially. It owes its importance to the facts —

1 It is a convenient starting-point for the Continental and South Atlantic routes

2 It is a convenient calling-point for ships plying between America and the Continent

3 Its peculiar position at the head of two estuaries (What are they?) causes it to have "double tides"— *i e* it has practically continuous high tide and ships can enter the port at any state of the tide

Let us now compare two ports which have attained great commercial importance by similar advantages. We will take Liverpool and Glasgow. The main features of comparison in each case are :—

1 They both face west and are therefore well placed for trade with Ireland and America

2 They are on large estuaries

3. But both estuaries have had to be artificially dredged and deepened.

4. Extensive system of docks in both. Liverpool has seven miles dock frontage

5. Both outlets for large coalfield and manufacturing area.

6 Both connected with shipbuilding and cotton industries. Liverpool mainly dependent on *cotton*, Glasgow on shipbuilding.

7 Both connected with important towns by canal (What are they?).

8 Railway connections in every direction (work these out for yourself).

Lastly, there is London, our biggest port. How is it that it has grown to such importance. seeing that it is nearly a hundred miles from the nearest coalfield and large manufacturing area? Here, again the circumstances are exceptional. It will therefore be a valuable and interesting lesson for the student to work out the problem for himself. though we suggest that the key to the answer lies in the position of London as a distributing centre.

In order to get some idea of how the commerce of our great seaports is carried on in practice we will conclude this chapter by examining the working of two typical ports, Hull and Bristol. Both of these towns are historically ancient and have long been identified with commerce in all its branches. Years ago Bristol was far more important than Hull, and now, although it has been outstripped by its Yorkshire rival, it still retains a large import trade.

Let us see how each has developed and what points of comparison and contrast there are between the two ports. We will number our points

1. Both cities are connected with a large estuary Hull is directly on the Humber, but Bristol City lies six miles up the Avon river.

2. Both ports have a river flowing through them.

The Avon is navigable to the heart of Bristol for vessels 300 feet long and drawing about 30 feet of water. The Hull traverses the town in a northerly direction and is navigable for lighters and small craft

3 The country round Hull is very flat, that round Bristol less so. In both cases there have been no real difficulties in the way of communications.

4. Consequently roads, rail and canals serve both ports

5 Hull faces east and has developed through its trade with Scandinavia, the Baltic and Dutch ports.

Bristol faces west and has developed through its trade with Ireland, the West Indies and America.

6. Both cities have had to extend their dock system to cope with the increase in trade and the size of the modern vessels Thus —

In 1884 —Avonmouth and Portishead docks were opened
1885 —The Hull and Barnsley Railway opened their Alexandra Dock at Hull.
1908.—The Royal Edward Dock was opened at Avonmouth.
1914 —The King George Dock opened at Hull.

7 Both cities serve coalfields. Bristol is on a coalfield, near another in North Somerset and within twenty miles of Cardiff, the outlet for the South Wales coalfield Hull is not on a coalfield but serves over 300 collieries in the South Yorkshire area (the biggest coalfield in the United Kingdom), from which it is distant but forty miles

8. Both towns are outlets for a large population Within a radius of fifty miles of Bristol there are two to three million people, and within a like radius from Hull are some of the biggest manufacturing towns of

Yorkshire. The following towns lie within a fifty mile radius :—

Hull		Bristol	
Leeds	Total population of 1,100,000	Cardiff	Ebbwvale
Wakefield		Newport (Monmouthshire)	Worcester
Doncaster		Barry	Gloucester
Rotherham		Port Talbot	Swindon
Sheffield		Dowlais	Taunton
Lincoln		Merthyr	
Gainsborough			

Notice that Hull is the natural outlet for the Yorkshire coalfield, but Bristol is *not* the natural outlet for the South Wales coalfield, which has its own ports The other towns on this list are comparatively insignificant, so it is clear that :—

Hull has a large manufacturing area to serve and carries on a great export trade, whereas Bristol, backed by no large manufacturing region, has but a small export trade considering the size of the town.

The Bristol Channel and the Severn are obviously well placed for communication with the Midland coalfield, so that one might reasonably suppose that Bristol would be an outlet for Midland manufactured goods and an inlet for their raw material. So it is to a certain extent. But you should measure the distance from Birmingham to Bristol, Liverpool and Hull, and you will find that Liverpool is just as near Birmingham as Bristol, and that Hull is but thirty miles further than Liverpool is. So it is clear that unless Bristol port can offer advantages as to dock dues and shipping facilities a manufacturer at, say, Wolverhampton or Birmingham may just as easily ship his goods from Liverpool or Hull

Again, Bristol is no nearer Ireland than Hull is to Antwerp, and Hull is much nearer the Scandinavian and Baltic ports than Bristol is to American ones So that on the whole we may say that Hull has the superior position as a trade outlet. Moreover, we

must remember that Hull has not had to meet the direct competition of an enormous port like Liverpool.

As regards communications inland, you will see from the following summary how each port is served by some of the great railway companies and also by canals.

Port	Railways	Canals
Bristol	G W R , M R *N B* —The G W R main line to S Wales, Fishguard and Ireland via the Severn Tunnel does not touch Bristol	1 Berkeley Canal from Sharpness to Gloucester 2 Severn Canal from Gloucester to Worcester and the Midland coalfields 3 Feeder Canal to Bath (of limited local importance) 4 Kennet-Avon Canal to Reading *N B* —This is practically disused now Only 1 and 2 are commercially important
Hull	*N B* —Hull and Barnsley (H and B) L N W R , G C R have running powers over other companies' lines into Hull	1 Aire and Calder Navigation from Leeds and Wakefield to Hull Goods can be loaded or unloaded direct alongside ship in dock 2 Sheffield and South Yorks 3 Leeds and Liverpool 4 Grand Junction 5 Trent Navigation, by which barges can reach Nottingham,Derby,Leicester, Northampton, Birmingham, etc No 1 is the most important

There is no need for us to enter into details as to the steamship lines using these ports for foreign trade as

they are dealt with elsewhere But a few points about the coastal trade are worth noting.

Both ports carry on a considerable coastal traffic In this Bristol has an advantage in that she is well placed for trade with Ireland. The following figures show that in the general coastal trade there is not much to choose between the two ports, but when the Irish trade is taken into account Bristol is seen to possess an advantage of nearly 500,000 tons of shipping a year.

	General coastal trade, in tons (1913)	Trade with Ireland, in tons, (1913)	Total, 1913
Bristol	2,511,636	300,794	2,812,430
Hull	2,340,896	3,631	2,344,527

There are weekly services from Bristol to the Irish and Clyde ports and to Leith and Aberdeen There are daily services to the South Wales ports, Gloucester and Birmingham (by Severn Canal Carrying Co.).

The Dundee, Perth and London Shipping Co. have regular sailings between Hull and the East Coast ports of Scotland and England

Thirty English and Scotch ports and sixty Continental ports are within weekly service of Hull

Having seen the means of distribution, we will consider briefly of what goods the import and export trade consist Bristol is not a manufacturing town on a really large scale, moreover it is not backed by a large coalfield and manufacturing area Consequently its exports are comparatively small In 1913 they were just over £4,000,000 worth Tobacco (Imperial Tobacco Co) and cocoa (J. S. Fry and Son, Ltd.) are important industries There are soap works, tanneries, boot and shoe factories, etc , and the products of all these we may expect to figure in the export

list, but by far the most important export item is iron goods, especially galvanized iron.

At Hull coal is the chief export and values now over £7,000,000 annually In addition, cotton and woollen manufactures, machinery, fish, etc , figure on the list. Total exports from Hull in 1913 were worth, roughly, £29,000,000 Thus, as we expected, there is a large difference between the value of the export trade of each port In imports they are more equal

Generally speaking, Bristol will obtain goods from North and South America, the West Indies and Ireland Hull will deal largely with the products of Northern Europe and with countries like the Argentine and India, which can supply her with grain, linseed and cotton seed In recent years a growing amount of raw wool has been imported into Hull direct from Australia Both ports deal largely with grain, fruit, oil and dairy produce.

We see from the above that Hull has three trades in which Bristol does not compete · viz coal for export, oil-seed manufactures; fish export On the other hand, Bristol's import trade of bananas and tobacco has no counterpart at Hull

The following figures illustrate a typical year's import of some commodities ·—

	Grain (qrs)	Bananas (bunches)	Oranges and lemons (boxes)	Oil (tons)	Dairy produce (tons)
Bristol	3,591,615	2,385,759	303,955	127,000	34,461
Hull	7,015,551	51	545,850	52,000	56,385

The total value of the import, export and coastal trade for 1913 was —

Bristol	£20,831,882
Hull	£86,948,944

We give a Table showing some comparative details of dock accommodation, etc, a diagram showing a generalized example of the way in which goods are handled at a big port, and diagrams showing the general plan of the docks at both ports, and one showing a portion of the river Hull and the industries it serves (see pp. 95–98)

Both Avonmouth and the Hull Docks are fitted with the very latest devices for making transhipment operations as speedy and as easy as possible Each wharf is fitted with cranes of all types and is traversed by railway lines so that goods can be loaded direct from the ship's hold to the railway vans or vice versa, as the case may be There are large ferro-concrete warehouses for storing general merchandise, sheds for cold storage, silos for grain and tanks for petroleum.

At Hull, since coaling is so important there, hydraulic cranes and electrical belt contrivances are used which can load as much as 800 tons of coal an hour. If all the coaling appliances at the Hull Docks were in use at the same time nearly 10,000 tons an hour could be shipped.

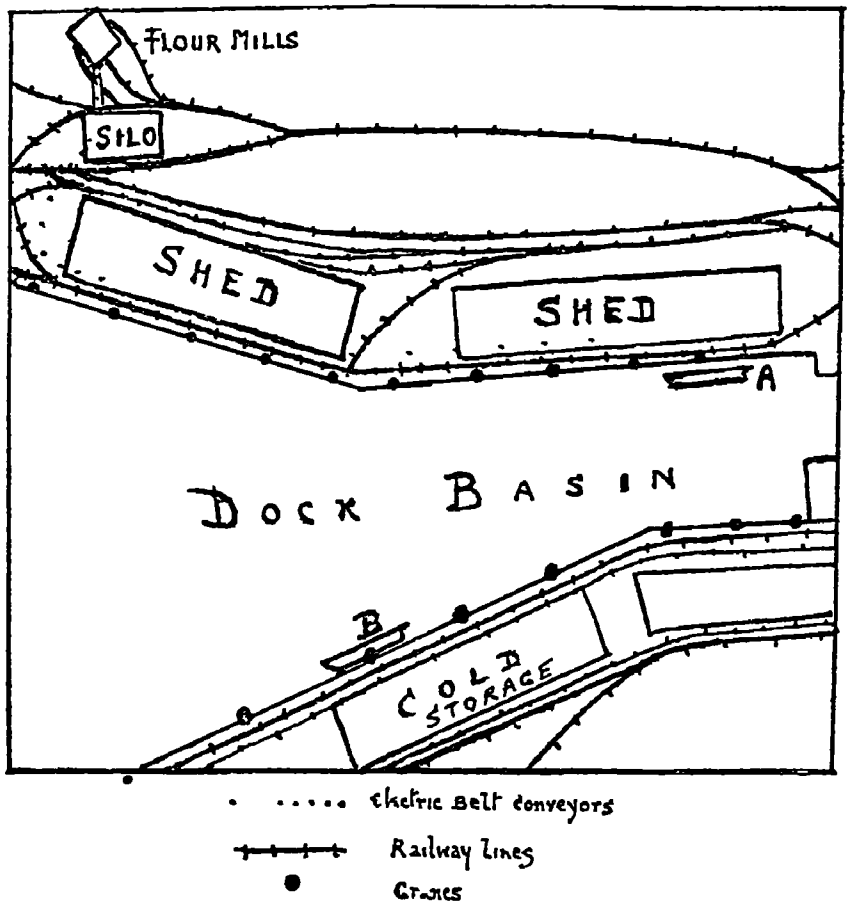
At Bristol, where coal is needed only for bunkering and not for export, no such costly machinery is necessary, and the coaling is done by gangs of men working from hulks alongside the vessel. In this way each gang of men will load about twenty tons an hour. At this rate it would require forty hours to load the same amount of coal as the Hull machinery could ship in one hour. This shows how machinery can save both time and labour

Frozen meat, fruit, fish, etc., can be transferred, as we have said, direct from the ship's hold either to properly constructed railway vans or to cold storage sheds In the former case a consignment in this way can be sent off by rail the same day as it is received in port.

Oil, too, can be pumped through pipes direct from

a steamer into the storage tanks or from tanks into a waiting vessel

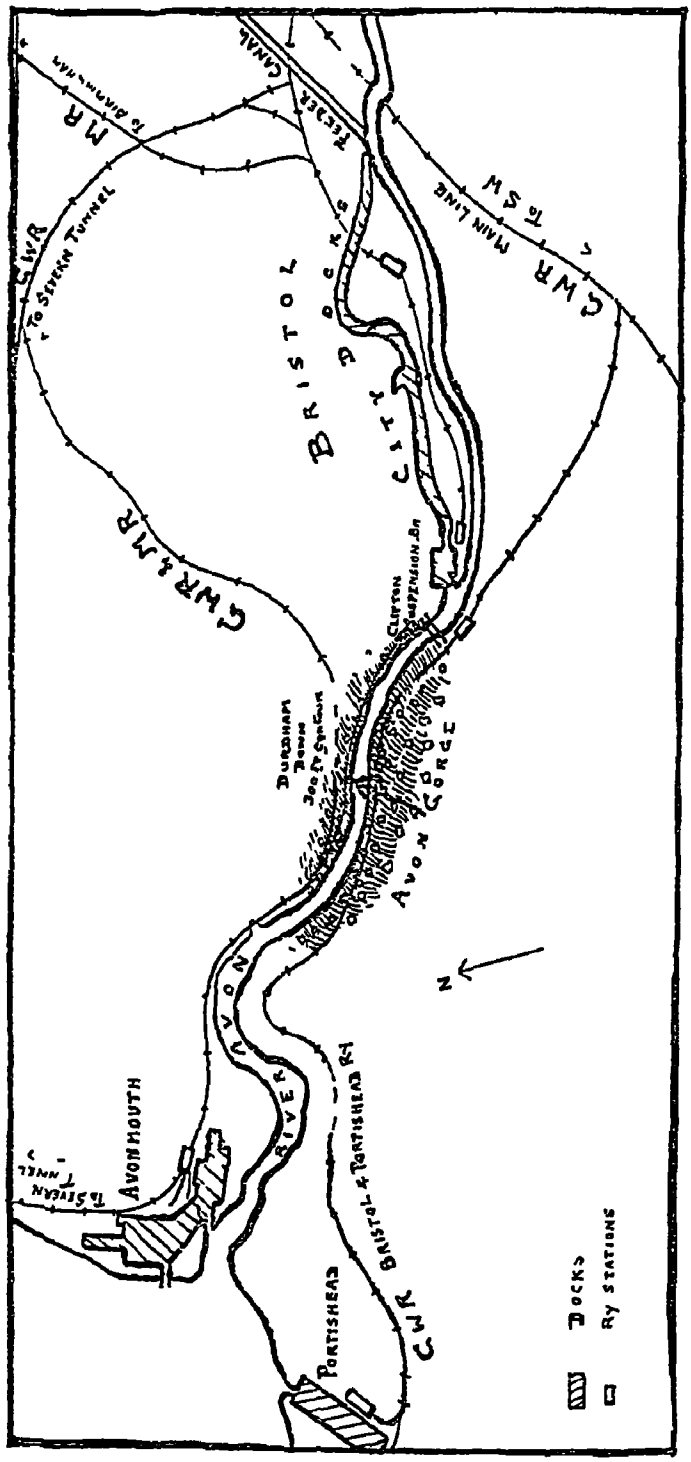
Perhaps the methods for discharging grain are the most interesting and ingenious Generally speaking, three kinds of devices are used, all of which carry the grain direct from the ship's hold into the silo



1 The grain is drawn by air suction through pipes.

2 The grain is transferred by an elevator working on the endless bucket system.

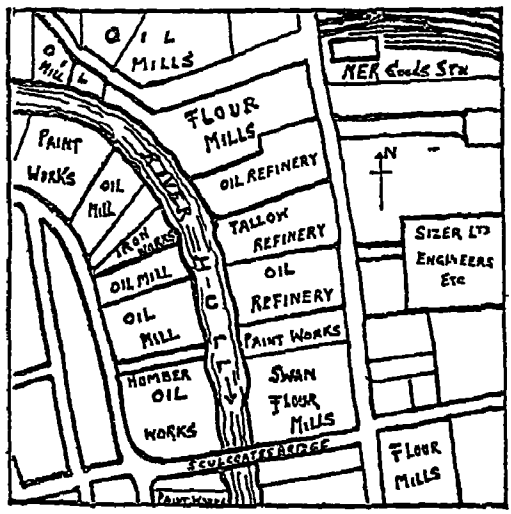
3 The grain is mechanically conveyed from the ship to electric belt conveyors which carry it into the silo as shown in our diagram



General Plan
of
Bristol Docks

The various devices for speeding up the transit of goods at our great ports are all worth study, and you cannot do better than watch them actually at work whenever you have an opportunity

Grain from the hold of the ship A can be transferred direct to the electric belt conveyors which are situated underground, and in this way traverse the whole length of the two sheds and communicate with the

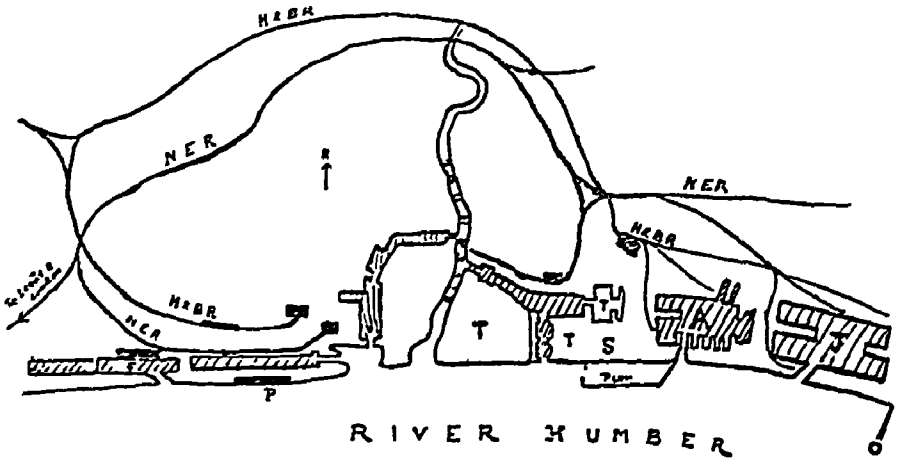


PLAN OF PORTION OF RIVER HULL
showing industries on its banks

Reproduced, by the kind permission of the Editor, Mr H. C. Newham, from *The Port of Hull Annual*, 1913

silo where the grain is stored If necessary, by a further section of belt conveyors the grain can be transferred from the silo to the flour mills as shown on the diagram Both grain and flour can be, conversely, carried from these places into the hold of a waiting steamer or loaded directly on railway trucks

In a similar manner the crane opposite the vessel B will transfer a cargo of meat either to railway vans or to the cold storage.



Based on a plan in *The Port of Hull Annual*, 1913 By the courtesy of Mr H C Newham

	Total water area of docks (in acres)	Dimensions of largest dock	Shed accommodation at largest dock	Cold storage capacity (in cubic feet)	Dimensions of graving docks	Capacity of oil storage
Bristol	144	Royal Edward Dock 1120×1000 ft	Six warehouses capable of holding about 50,000 tons of general goods	300,000	875+100 ft	Avonmouth 12,000,000 gallons
Hull	235	King George Dock, main basin 1000×1050 ft	Six warehouses capable of storing 73,000 tons of general goods	890,000	Five docks each averaging 522×61 ft	Saltend oil jetty

QUESTIONS ON CHAPTERS XVIII—XIX

41 From what ports on the East Coast will fish be sent to London? By what routes will the consignments come? To what market?

42 Consider the means of sending—

(1) A consignment of salt from Nantwich to the Pottery districts of Staffordshire

(2) Fruit from Bristol to Reading.

Say which routes you would choose for the purpose and give your reasons

43 The following ports are connected with the Cumberland coalfield Silloth, Maryport, Workington, Whitehaven, Barrow To where might they export coal? Why has Barrow a shipbuilding industry?

44 Slates are an important export from North Wales. There are large quarries at Llanberis, Penhryn (near Bethesda, and Festiniog From what ports would the slates be shipped? Draw a diagram to illustrate the above facts

45 Belfast is an important shipbuilding centre Whence can it best obtain coal and iron? By what routes would these reach Belfast?

46 Hull imports pit-props from Russia and Scandinavia Cardiff imports them from Gascony (France) and Portugal What coalfields would use them? By what routes would they be imported?

47 A great quantity of Danish dairy produce is sent to England From and to what ports would it be shipped? What is the distance between the ports? What exports are we likely, in return, to send Denmark? Why?

CHAPTER XX

OUR MERCANTILE MARINE

THE British Empire owns nearly half the world's shipping tonnage and is, in fact, a specialist, so to speak, in the carrying trade. Moreover, the United Kingdom is the greatest shipbuilding and ship-repairing nation.

Now these industries require vast quantities of coal, iron and steel manufactures. It is natural, therefore, to find our shipbuilding ports either on or within easy reach of coalfields and iron ore districts. We have, then, the following areas as centres of this industry —

Area	*Shipbuilding Centres*
Newcastle and Durham coalfield	Newcastle, Wallsend, Jarrow, N. and S. Shields, Sunderland, Middlesborough, Hartlepool, West Hartlepool, Stockton-on-Tees, Howdon-on-Tyne
The Clyde estuary	Greenock, Port Glasgow, Dalmuir, Dumbarton, Clydebank, etc
The Mersey estuary	Birkenhead
N.E. Ireland	Belfast
Cumberland	Barrow

Our shipbuilding firms have attained world-wide repute. The following are the names of some well-known firms. If you know of any others you should add them to the list:—

Port	*Firm*
Dalmuir	W Beardmore & Co , Ltd.
Clydebank	John Brown & Co
Newcastle	Sir W G Armstrong-Whitworth & Co (Elswick Works)
Wallsend	Swan, Hunter & Wigham-Richardson, Ltd
Sunderland	William Doxford & Sons
Birkenhead	Cammell Laird & Co , Ltd
Belfast	Harland & Wolff, Ltd
Barrow	Vickers, Ltd

Any one interested in shipbuilding should read about the various types of vessels built huge oil tankers capable of holding many thousands of tons of oil, ships for cold storage capable of carrying four or five million pounds of meat at a time, floating docks constructed over here and towed to such distant places as the Bermudas or the west coast of South America; tug boats; dredgers capable of lifting thousands of tons of sand an hour; steam trawlers, and a host of other craft. Our capacity for shipbuilding may be gauged from the fact that in 1913 we built (excluding warships) over 1000 vessels, of which 202 (of 360,000 tons gross) were for foreign countries

We are also famous as a ship-repairing nation, and many wonderful repairs of badly damaged vessels stand to the credit of our shipyards. Many firms are ship-repairers only, *i e.* they are specialists in this line of work The largest liners can be repaired on the Mersey, at Belfast and Southampton. The capacity of the Clyde shipyards is nearly as great, and the Tyne, Tees and Bristol Channel ports do the bulk of repairs for cargo vessels. It is said that within a single week during the Great War as much as 2 million tons of shipping have been in hand for repairs, and that within this time vessels amounting to half a million tonnage have been repaired and made fit for work again. An industry which works

on such a large scale is obviously of the highest commercial and naval importance

Our merchant service is engaged in—

1 The import and export trade of the United Kingdom

2. The import and export trade of foreign countries, *i e.* the carrying trade

3. Coastal trade, *i e* trade from port to port in the United Kingdom

For reasons which we have already stated in this book, the general tendency is for the big shipping companies to combine in groups In this way strength of capital for carrying on various enterprises is assured. There is, of course, a certain number of independent shipping companies, but it is gradually lessening as the great groups from time to time absorb new members In these "combines" each company may retain its own house-flag, but its policy and capital is controlled by the authorities at the head of each group.

We give here in a condensed form the most important of these shipping groups, the chief lines which are members of each group and the routes served by the individual lines of steamers They are as follows :—

(N.B.—The list is for reference only)

I. *The Cunard Group*

Cunard line.—Liverpool and Bristol to Canada, Boston and New York; Liverpool to the Mediterranean ports.

Anchor Line.—Glasgow and New York to Bombay.

Anchor-Brocklebank Line.—Glasgow and Liverpool to Calcutta

Commonwealth and Dominion Line.—London, Middlesborough and the Tyne to Australia.

II *P & O Group*

P & O (Peninsular and Oriental Lines)
B I. (British India) } Suez route to India and the Far East

New Zealand Shipping Co —London to New Zealand (via Panama)

Federal and Shire Lines —London, Bristol, Manchester and Glasgow to Australia and New Zealand.

III *International Mercantile and Marine Group*

White Star Line.—Liverpool to New York and Boston, Liverpool to Australia via the Cape

Leyland Line —Liverpool to Boston, New Orleans and West Indies.

Dominion and White Star Line —Bristol to Canada

White Star, Shaw, Saville and Albion Line — London to New Zealand.

Atlantic Transport Line.—London to New York (cargo and first-class passengers only)

IV. *Ellerman Group* (controlled by Sir John Ellerman)

Ellerman City and Hall Line —Glasgow, Liverpool and London to India

Ellerman Wilson Line —Hull to Baltic ports, India, New York, etc

Ellerman Bucknall Line —London to the Cape and East Africa

Ellerman Strick Line —Liverpool, London, Manchester and the Tyne to Southern India and Persian Gulf ports

Ellerman Papayanni Line —Liverpool to Mediterranean ports and the Levant.

V *Furness Withy Group* (cargo mainly)

Furness Line—Glasgow and Leith to Boston and Philadelphia; Liverpool to Newfoundland

Johnson Line—Liverpool to Baltimore

Prince Line—London to River Plate, London, Tyne and Manchester to Mediterranean and Levant.

Houlder Line.—London and Liverpool to the Argentine (largest frozen-meat-carrying steamers).

VI *The Royal Mail Group*

Royal Mail Steam Packet Co, Ltd (R M S P.)—Liverpool and Southampton to Brazil and River Plate

Pacific Steam Navigation Co (P S N C)—Liverpool, London and Glasgow to west coast of South America via Panama, Liverpool and Glasgow to west coast of South America via Straits of Magellan, London to Colombia and Colon, London to Gibraltar and Morocco, Canada to West Indies and Demarara

Union Castle Mail S S Co, Ltd—Southampton to South and East Africa.

Lamport and Holt Lines—Glasgow, Liverpool, Manchester, Middlesborough, Antwerp and London to Brazil and River Plate.

Elder Dempster & Co Ltd—Liverpool to West Africa.

Orient Line—London to Australia, etc.

There is, in addition to the above great companies, a mass of different shipping lines engaged in coastal trade. We can arrange these also in groups. Of

course, here we can notice only a few lines just sufficient to show how trade is carried on from port to port.

Our first group we may call (A) the *East Coast Services* In this we have (*a*) trade between the Tyne and Tees ports, Hull and London (much coal sent to London), (*b*) trade between London, the East Coast ports and Scotland (Aberdeen, Leith, Dundee)

Another group is based on *Glasgow* (B). Here, for instance, we have The Clyde Shipping Co. with two services —

(1) Glasgow to London via Southampton, Plymouth, Belfast (twice weekly).
(2) Glasgow and Ireland (Belfast, Waterford).

This company's steamers run twice weekly as a rule, carry cargo and live stock and generally accommodate about eighty passengers The vessels average 1000–1400 tons. In this group, too, W. Sloan & Co. of Glasgow run steamers between that port, Belfast and Bristol Channel ports.

Our third group (C) is based on *Liverpool* In this we have weekly services between Liverpool and the Bristol Channel. Cotton goods from Manchester are shipped south, and copper ore from Swansea or Newport can be sent north

There are also steamers plying between Liverpool and London via Falmouth, Plymouth and Southampton

Of *Independent Companies*, the Cork Steam Packet Co. run weekly services between Cork and Liverpool, Fishguard, Bristol and London. Much Irish dairy and live stock is shipped by this route.

The City of Dublin Steam Packet Co., Ltd, carry passengers, mails and cargo daily between Dublin and Liverpool, Kingston and Holyhead.

CHAPTER XXI

INLAND WATERWAYS

A COUNTRY which has large rivers navigable for a long distance has a cheap and valuable means of transport.

The British Isles are not well served in this respect Our rivers are neither large nor navigable very far In fact there are only five rivers which afford any prospect of good inland transport They are the Trent, Humber and Yorkshire Ouse, Severn, Thames and the Shannon in Ireland Of these the Shannon is said to be navigable for some 200 miles, but it flows through such a poorly populated area that its traffic is insignificant and we need not consider it here We will deal with the other rivers we have named.

Their capacity for transport purposes is very limited The Thames is navigable to Reading for vessels of 150 tons drawing five feet of water Above Reading it is practically useless The Trent is a tidal river for fourteen miles beyond Gainsborough, and, in a favourable season, boats carrying sixty to seventy tons can reach the junction of the Trent and Mersey canals. But the river has really little value as a means of transport because it is subject to floods and droughts. The Yorkshire Ouse is tidal to within five and a half miles of York, but is only used by small craft of 90 to 100 tons. The Severn is navigable for vessels of 200 tons and nine feet draught as far as Worcester, and from Sharpness to Gloucester ships of 1200 tons can ascend by means of the Berkeley Canal.

So much for our rivers Now let us turn to our artificial waterways—canals. The following are the only canals of real commercial importance :—

The Manchester Ship Canal
The Caledonian Canal in Scotland
The Aire and Calder Navigation
The Leeds and Liverpool Canal
The Trent and Mersey Navigation
The Shropshire Union Canal
The Grand Junction Canal
The Birmingham system of canals.

These and other canals in the United Kingdom are owned and worked by various authorities. The majority are owned and run by private companies, but a good many belong to the great railway companies.

Canals, as we have seen in a previous chapter, are useful—

1. For helping to relieve some of the goods traffic on the railways which already have enough work to do.

2 Because they are a cheaper form of transport than rail.

3. For carriage of bulky materials such as coal, ore, salt, timber, etc.

If canals are to pay they ought to run through industrial districts and they ought to be close to the manufactures and coal mines, so that there is little expense in getting the raw material to the canal barge It is clear that if you have to go to expense in bringing your goods to the canal side you can send them as cheaply and much more quickly by rail. You will remember that in Chapter XI we examined the canal systems of Germany, Belgium and France and found that they served industrial areas of dense population

Some of our waterways do likewise, but some do not, and these latter we expect to be not very profitable. Take, for instance, the Caledonian Canal in

Scotland. It can be used by steamers of 500 tons drawing fourteen feet, and saves 250 miles (say, thirty-six hours) of journey for such vessels plying between German or Tyne and Tees ports and Glasgow Yet the canal is little used You will see that it does not traverse an industrial district There are no coalfields and practically no manufactures in that part of Scotland, population is scanty and commerce very small. Moreover, many locks on the canal cause much waste of time to boats passing through them For these reasons, then, it would not be worth while to spend money on trying to improve this waterway.

The other canals we have mentioned serve industrial areas and therefore do pay in varying degrees The Aire and Calder Navigation is a well-organized system, and carries large quantities of coal from Leeds and the Yorkshire mining districts to Goole and the Humber ports. In fact it is the most flourishing of all our inland waterways, and makes an annual profit of £300,000.

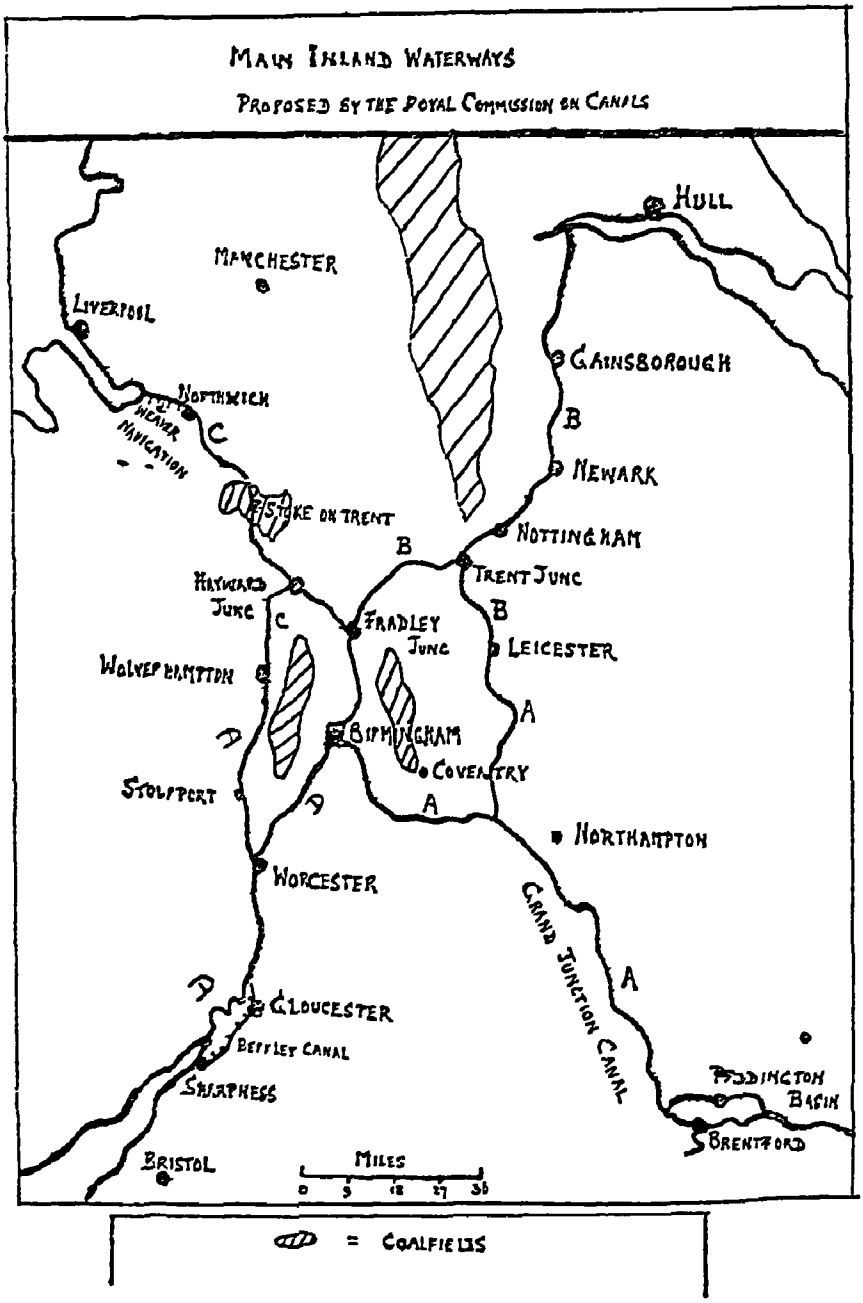
The Trent and Mersey Navigation, which makes use of the canalized Weaver River, is another useful system. It links the Pottery district and the Black Country with the Upper Mersey. By it the "Potteries" obtain Cheshire salt Lancashire chemicals and Cornish china-clay.

Another useful canal, running more or less parallel to the last named, is the Shropshire Union Canal, owned and run by the L.N.W.R., who have spent much money in establishing a terminus of considerable importance at Ellesmere Port on the Mersey This canal serves the agricultural plain of Cheshire, and links it up with the Wolverhampton and Birmingham districts, in which there is a close network of canals which carry on an extensive local traffic in coal and iron goods. You see the canals here are well placed because they traverse coalfields,

have all kinds of hardware factories along their banks and serve an area of dense population.

Now there are many people who think that our canal system could be very much improved and made more profitable. A few years ago the Government held a very important inquiry on this subject, and most of the experts employed to consider the question agreed that if certain improvements were made to the Mersey and Trent, Birmingham and Grand Junction systems a great increase of trade on the canals would follow, as these improvements would make possible a continuous system of inland water transport directly linking up the seaports on the estuaries of the Mersey, Humber, Severn and Thames The following diagram, based on the large map in Vol VII of the *Canal Commission Report*, will give you an idea of the apparent simplicity and advantages of such a scheme.

But the scheme is not nearly so simple as it looks. There are many difficulties to be overcome, and these you may see for yourself if you take a walk for any distance along the towing-paths of any of these canals You will notice, for instance, that there are many locks (*e. g* there are 216 in 159 miles on the Birmingham canals), and that these are often very small Also that there are many tunnels and inadequate bridges, and, most serious of all, the canals are far too narrow and would have to be considerably widened, and such widening in the Birmingham district, for example, means pulling down factories, compensating the owners and upsetting trade for a considerable time. Lastly there is the objection that our canals often traverse country of such an altitude that much money has to be spent on building reservoirs and pumping machinery to ensure an adequate supply of water. You will probably be surprised to hear that pumping operations on the Birmingham system alone cost £11,000

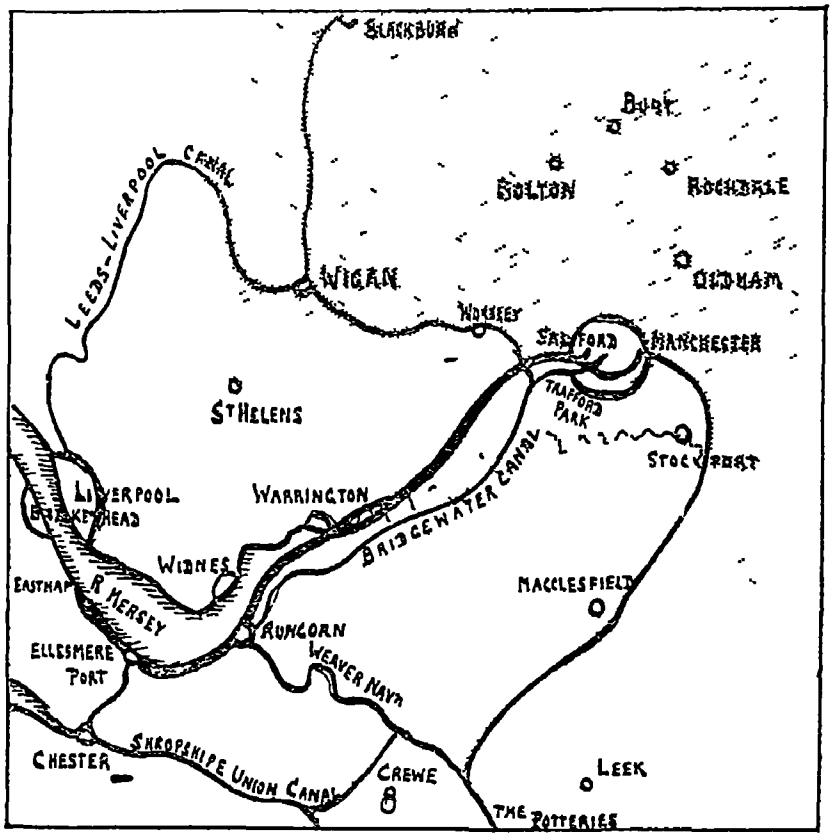


Route	Barge capacity in tons
A	100
B	750 to Nottingham
C	400 to Northwich
D	750 to Worcester 600 to Stourport

annually. These and other disadvantages would in any case make the proposed scheme a very costly one.

In conclusion we must notice the Manchester Ship Canal, which stands in a class by itself and cannot be

DIAGRAM TO ILLUSTRATE RELATION OF MANCHESTER SHIP CANAL TO COALFIELDS AND INLAND WATERWAYS



= MANCHESTER SHIP CANAL
SHADED AREA = COALFIELDS

compared with our other waterways, which are not ship canals. This canal carries not merely seventy-ton barges, but large cargo steamers of 10,000 tons drawing twenty-eight feet of water For all practical purpose, therefore, the canal is as good as a navigable estuary, and for this reason it has created a new port,

Manchester There are large docks, cold storage and live cattle accommodation, oil tanks capable of storing 37 million gallons of oil and two elevators capable of holding 80,000 tons of grain

In addition there are splendid sites at Trafford Park for factory development. Many large and important business firms have already established factories there, for the estate abuts on to the Manchester Docks, and thus goods and raw material can be sent direct to the factory from the steamer with the least possible handling and the saving of transport charges The estate is intersected by railways which link up with the Manchester Dock Railways, which in their turn are connected with all the great lines, viz L N W R, L & Y, G N, M R, G.C R and Cheshire lines.

The canal itself is also in direct communication by water with the other important canals, such as the Leeds and Liverpool, Aire and Calder, Weaver Navigation, etc, and these facilities have made Manchester the fourth port in the United Kingdom and the second port for oil and cotton imports

All this shows what can be done by commercial enterprise and successful organization We append a generalized diagram showing the course of the ship canal and the economic area served by this valuable waterway

CHAPTER XXII

RAILWAYS

THE total length of railway track (excluding sidings) in the British Isles is over 23,000 miles The whole system is controlled mainly by thirteen great companies eleven in England and Wales and two in Scotland Of these nine have their termini in London In Scotland the Caledonian Railway and the North British Railway are by far the most important In Ireland the Great Southern and Western and the Midland Great Western are the chief lines; but the traffic they carry is insignificant, and we shall in this chapter leave them out of account.

First let us put down the names of the main lines and the abbreviations for them —

The Great Central Railway (G C.R), the Great Eastern (G E R), the Great Northern (G N), the Great Western (G W R.), the London and North-Western (L N W R); the London and South-Western (L S W R), the London Brighton and South Coast (L B S C R), the Midland (M R), the South-Eastern and Chatham (S E C R), the Lancashire and Yorkshire (L Y), the North Eastern (N E R), the Caledonian (C R); the North British (N B R.)

Now if we draw on a map a straight line from Bristol passing just south of Northampton and terminating at the mouth of the Bedford Ouse, we shall have a line which will roughly but conveniently divide England and Wales into two areas. South of the line will be mainly an agricultural region, north of the

line mainly a manufacturing area We will call these areas A and B respectively.

Then those railways which serve mainly the southern area will have a small goods traffic, comparatively speaking and those railways serving the northern area will have a large goods traffic. And it is with goods traffic that we are mainly concerned here Now let us arrange our lines accordingly; we shall have .—

Group A —G E R L B S C R . S E C R. L S W R , part of G.W R , part of G N R.

Group B—L N W R , M R , G C R , N E R , L & Y : part of G W R . part of G N R.

At the end of this chapter we give a Table of figures showing some facts about the great English and Welsh railways Let us see what information we can extract from it.

First you will notice several small figures (4, 3, 4. 7) in the column representing mineral traffic In the same column notice some particularly large figures (44, 45 51, 41½).

If you find to what lines these figures belong, you will see that we arrive at the following facts —

1. Small mineral traffic is associated with the A group of railways
2. Large mineral traffic belongs to the B group

Thus our original statement is proved to hold good We have found, in other words, that these railways which serve the manufacturing areas are the more important from a commercial and trading point of view.

Now let us examine the Table in more detail and try to account for some of the more striking figures

1 The lines in Group A are mainly concerned with passenger traffic. You will notice, for instance, that the G.E R. carries the second largest number of passengers; in fact nearly double the number of

passengers carried by the M R , although this latter company has 400 more miles of track

Both these lines serve areas of dense population

The S E C R and L B S C R. carry even a larger passenger traffic in proportion to the length of line What we want to know is, why is there this dense passenger traffic in the south-east of England? The following may supply the answer —

(1) Passengers going to the packet stations of Dover, Folkestone, Harwich, etc . *en route* for the Continent.

(2) People going to the health and pleasure resorts of Margate, Ramsgate, Brighton, Eastbourne, etc

(3) The daily population travelling between London and its suburbs (*e g* Stratford, Romford, *etc*).

Notice, too, the heavy passenger traffic on the N E. and L & Y. railways It will not be difficult for you to explain this.

2 Arranging the railways according to the figures in column V , we shall have them in order of importance as regards mineral traffic.

The N E R will be easily the first; then follows the G W R , L N W.R , M R and G C R

You will see that the N E R has the least mileage of line, and yet carries the most goods. Obviously it is a most important line for commerce. It serves the great northern coalfields and the ship-building, iron-smelting towns of the Tyne and Tees districts. Moreover, it has no other big company to offer competition.

3 On the other hand, notice how the M R , L N.W.R. and G C.R. all serve the Midland manufacturing area There is great competition, therefore, between them, but plenty of goods to be carried, and so the traffic is heavy and well distributed. We must remember, too, there are canals to compete for carriage of coal and ore, so we may expect " freights " to be somewhat lowered.

4. The G.W R alone serves the great South Wales coalfield, and this must account for its large mineral traffic. Its extensive passenger traffic must be due to—

(*a*) The pleasure resorts of Cornwall, Devon, etc.

(*b*) The winter health resorts of Bournemouth and the Cornish Riviera, as it is called

(*c*) Its great extent of line

(*d*) Its serving the densely populated area round the Bristol Channel

5 The L & Y. Railway, though short, carries much mineral traffic because it serves the coalfields of Yorkshire and iron-smelting towns such as Sheffield.

We might note here an interesting little railway which is not given in the Table—the Furness Railway in Cumberland. It is only 134 miles long, but it carries double the mineral traffic that the Great Southern and Western of Ireland does, though this latter has 881 miles of track. This is an interesting contrast

You should find those railways on the map and notice that the one serves an iron and coal district, the other serves an agricultural area. In this way the figures are explained.

6 Goods under the heading of "general merchandise" (shown in column VI) include live stock, *i e* cattle, sheep, etc We should expect most to be carried by the railways in Group A But we cannot tell from the figures what proportion is live stock. Anyhow, we can guess that the G W.R. will carry a good deal, the L.N.W R and N E R are both in Group B, but must have a considerable live stock traffic, for the one serves the Cheshire plain and the other the plains round York

The Scottish railways (the C.R and N B R.) serve the great industrial area of the central plain of Scotland and link up the ports of the Clyde estuary with those on the Firth of Forth There must be much

coal and iron ore to be carried and the mineral traffic will be heavy

Lastly, try to reason out which railways in Ireland will be most important commercially.

RAILWAYS OF ENGLAND AND WALES

I	II	III	IV	V	VI
Company	London terminus	Length of line in miles open in 1911	Millions of passengers carried in 1911	Mineral traffic in 1911 (in millions of tons)	General merchandise carried in 1911 (millions of tons)
G C R	Marylebone	757	24½	29	6
G E R	Liverpool St	1133	98	7	6
G N R	King's Cross	856	35½	16½	5
G W R	Paddington	3006	102½	45	9
L & Y R	—	591	59	19	7
L N W R	Euston	1966	75	44	11
L S W R	Waterloo	964	68	4	2
L B S C R	Victoria and London Bridge	454	57	3	1
M R	St Pancras	1532	50½	41½	9
N E R	—	493	61	51	15
S E C R	Charing Cross, Holborn, Cannon St, Victoria	629	60	4	2

CHAPTER XXIII

MORE ABOUT OUR RAILWAYS

In the last chapter we dealt with our railways from a general point of view. We must now examine them in more detail.

First, then, let us notice that the main lines are all in touch with the great ports. Thus the G.W.R. serves Plymouth and the Bristol Channel ports: the L.S.W.R. serves Southampton and Portsmouth. the N.E.R., Hull; the L.N.W.R., Liverpool, and so on.

Next we observe that some of the companies engage in cross-Channel traffic, and therefore have what are called "packet stations" and their own lines of steamers. The following is a list of the more important ones:—

Company.	Continental service.	Company.	Irish service.
G.E.R.	Harwich–Hook of Holland	L.N.W.R.	Holyhead–Dublin
		L. & Y.R.	Fleetwood–Belfast
L.B.S.C.R.	Newhaven–Dieppe	G.W.R.	Fishguard–Rosslare
S.E.C.R.	Dover–Calais	M.R.	Heysham–Belfast
	Dover–Ostend		
	Queenborough–Flushing		
	Folkestone–Boulogne		
G.W.R.	Weymouth–Channel Is.		
L.S.W.R.	Southampton–Havre		

Now let us examine some line in detail. We will select the North-Eastern because its system is compact, comparatively simple to follow, and there are no competing lines with which to muddle ourselves.

This line has its headquarters at York, and is really a continuation of the G N R , but it is generally taken to begin at Doncaster It serves three great industrial centres —

1 The West Riding of Yorkshire outlets, Goole and Hull

2 The Durham coalfield outlets, the Tees ports

3 The Northumberland coalfield outlets, the Tyne ports

As we saw in the last chapter, it has, therefore, a great mineral traffic It takes coal to the ports for shipment to London or for bunkering purposes; much coal also to the shipyards and iron-smelting furnaces of such towns as Middlesborough, Sunderland, and so on.

Obviously, too, it must carry large quantities of manufactured woollen goods to Hull for export; imported raw wool from Hull to the Yorkshire manufacturing towns such as Leeds, steel goods from Sheffield, rails and locomotives from Darlington

Next observe that it serves also—

4 The agricultural and pastoral plain of York

5 The pleasure and health resorts of the East Coast such as Scarborough

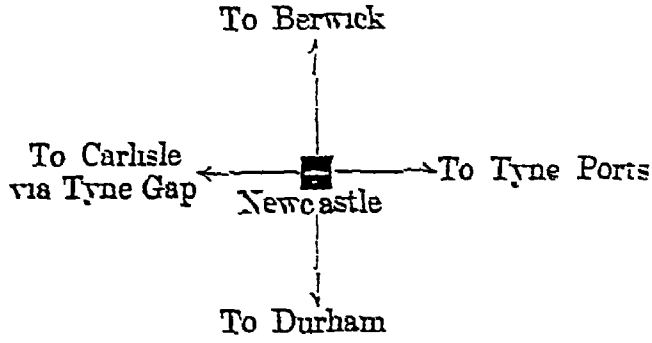
We may expect it, then, to carry much holiday and tourist traffic in the summer months and much live stock and agricultural produce

Lastly, observe its two routes from Newcastle (*a*) via the coastal plain to Berwick-on-Tweed; (*b*) via the Tyne Gap to Carlisle.

Newcastle, Leeds and York are the most important junctions

It is often useful to draw a small and simple diagram showing the routes radiating from an important

junction. In this way the facts are clearly impressed on your mind Thus we may represent Newcastle as a junction as follows .—



You could construct similar diagrams to explain the importance of, say, Leeds or Selby.

We append a diagram showing the main system of the N E R. and the country it serves

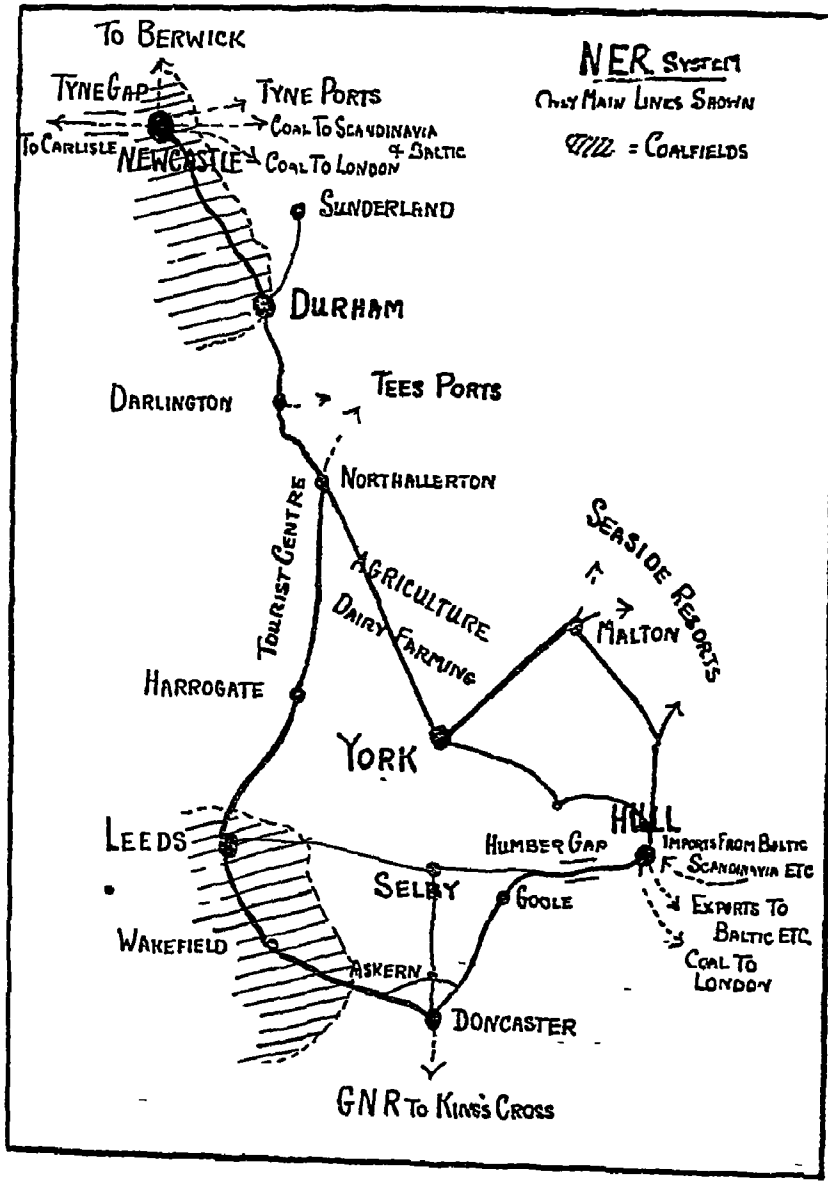
Sometimes one place may be reached from another—say Glasgow from London—only by passing over the lines of several railway companies The question then arises, how do the companies divide the profits arising from freights and fares? The answer is by the "Clearing-House" system

The Railway Clearing House is situated in London and the companies send in to it accounts of all the through bookings of passengers and goods It is the business of the Clearing House officials to distribute the proceeds or profits from these bookings in such a way that each company gets its fair share.

We give here in a very condensed form the routes followed by the principal lines of Group B in the last chapter. You should follow these carefully on the map and note gaps and valleys used by the railways and the chief controlling points and junctions To make the routes perfectly clear you should construct a diagram similar to the one of the N.E R. given in the text.

1 The L.N.W.R.—Main line (*a*) to Scotland. From

Euston via Berkhamstead Gap, Rugby, Stafford, Crewe, Warrington, Wigan, Preston, Shap Fell (1000 ft.) to Carlisle



(*b*) To Ireland.—Same route to Crewe, then via Chester, coastal plain of North Wales to Bangor, across Menai Straits to Holyhead.

From Crewe there are branch lines to Manchester and Leeds; Runcorn and Liverpool, Shrewsbury, Mid Wales and Swansea.

2 The G.W R —From Paddington (*a*) N W to Birkenhead via Thames Gap, Birmingham, Shrewsbury.

(*b*) West to Ireland via Reading, Swindon, Severn Tunnel, Newport, Cardiff, Carmarthen and Fishguard.

(*c*) S W. to Plymouth and Penzance via Swindon, Bristol, Taunton, Exeter or via Reading, Westbury, Taunton, etc

3. The M R —(*a*) To Carlisle and Scotland via Luton Gap, Kettering, Leicester, Chesterfield, Sheffield, Leeds, Appleby

(*b*) By same route to Trent junction, then (1) via Derby to Stockport and Manchester, (2) Nottingham

(*c*) From Derby to Bristol and Bath via Birmingham and Cheltenham.

4. The G.N R — From King's Cross to Doncaster and York via Peterborough, Grantham, etc (Note the G N R system really terminates at Askerne junction north of Doncaster)

5 The G C R —From Marylebone (*a*) to Sheffield via Princes-Risborough Gap, Brackley, Rugby, Leicester and Nottingham

(*b*) From Manchester via Sheffield, Retford and Gainsborough to Grimsby.

QUESTIONS ON CHAPTERS XVIII—XXIII

48 There are many good natural harbours on the west coast of Ireland but no important ports there How do you account for this?

49 What advantages has London as a centre for the distribution of imported goods?

50 Write an account of what you consider to be the chief things necessary to make a successful seaport

51 Describe the geographical conditions which have made the position of the following towns important, and illustrate your answer by diagrams —

Carlisle, Chester, Crewe, Cork, Chatham

52 What coal- and iron-fields are within easy reach of Belfast by sea? How far away are they? From what ports would the output of these areas be exported to Belfast? For what purpose would the coal and iron be used?

53 Describe the quickest route by which a tourist would reach—

(*a*) Killarney Lakes from London
(*b*) The Isle of Man from Bristol

54 Describe the routes by which early flowers and vegetables could be sent from the Scilly Islands to London, and give your reasons for selecting that route

55 What advantages has Fishguard over Queenstown as a port of call for homeward-bound liners from America to Liverpool?

56 A Birmingham hardware merchant wants to export a consignment of goods to Jersey Discuss some different routes by which he might send them

CHAPTER XXIV

DISTRIBUTION OF POPULATION

In Chapter XIII we found that the population of the United Kingdom is densest round the great coalfields. If you look at a map of the distribution you will see that there are three areas of especially dense population; they are—

London
Birmingham.
Lancashire and Yorkshire coalfields

London, of course, occupies a position combining many geographical advantages, and for this reason has always been a great place for the warehousing and storing of all kinds of imported goods, which are either re-exported from the London Docks or are sent all over the rest of England The Metropolis is, in fact, the greatest distributing centre in the world and the second largest port Its business is enormous, and for this reason the population is very dense Every year, however, sees the business part of the population residing further away from the heart of the city; such population is called "suburban" because it inhabits the outlying districts or "suburbs" of London proper. With the improvement and extension of electrical railways, tramways and motor-omnibus transport people find that they can live further and further away from their offices and yet have no difficulty in getting to their business premises every day. Thus the tendency of the population to grow in ever-widening circles of distribution is typical

of all our large cities This is only another way of saying that outlying towns and districts tend more and more to be absorbed into the big business centres. To take an example Manchester and Salford, which together had a population of 27,000 in the middle of the eighteenth century, have so increased in commercial importance that the population now is very dense for a radius of twelve miles from Manchester, and in this area are gathered between two and three million people

The same kind of process has been going on round Birmingham. There are yet other tendencies at work in the large manufacturing towns. We mean the tendency of these suburban towns to specialize in some branch of industry, and the tendency of the "capital" or central town to become the distributing centre

This is so with London and its Metropolitan boroughs Again, some Lancashire towns specialize in weaving cotton, others in spinning; Manchester itself being the distributing centre. Or take the Birmingham district. Redditch specializes in fish-hook and needle manufactures, Bromsgrove in nails, Walsall in harness and saddlery, Cradley in anchors and chains, while Birmingham itself manufactures all kinds of hardware and is the distributing centre

In addition to these three great centres of population there are other groups where the number of people per square mile is very large. Such, for instance, are—

The coalfields of the central plain of Scotland.
The Bristol Channel area.
In Ireland—Belfast and Dublin.

Note how the population of Scotland tends to gather in the central plain, because—

1 The plain is flat, whereas much of the rest of Scotland is mountainous.

2 It is fertile, though much of Scotland is barren
3 There are coal and iron ore fields there
4 The estuaries of the Clyde and Forth are within a short distance of one another and communication between them is easy.

Observe, also, how the population of Ireland is pretty evenly distributed on the whole, though there are areas of comparatively dense population round Dublin, Belfast and (in a lesser degree) Cork

Dublin is a gap town well placed for communication inland and across the Channel. Belfast owes part of its prosperity to the linen industry and part to the private enterprise which established the great shipbuilding firm of Harland & Wolff. Considering that this town has to import practically all its supplies of coal and iron ore, there seems no reason why shipbuilding should have grown up there any more than, say, in Dublin. This shows how artificial conditions may arise which eventually influence the distribution of population.

The population of Cork and the surrounding districts is connected with the export of Irish agricultural and pastoral products, for which purpose the port is well situated with regard to cross-Channel communication with the Bristol Channel ports.

Again, we must emphasize how the following types of places tend to attract population.

1. River and seaports.
2 Gaps in hills (*e g* Leeds and the Aire Gap), or points where roads and railways converge (*e. g* Reading, Stirling)
3 Gaps between hills and the sea (Edinburgh).
4 River crossings, bridges or fords (*e g.* Perth)
5 Belts of water-bearing strata (*e g.* line of villages at the foot of the North and South Downs, Wiltshire Downs and Mendips).
6. Places with some peculiar natural resource

such as mineral springs (*e g* Bath, Harrogate, etc) Doubtless you can think of many more.

Some towns have lost their former industries, but yet have retained commercial importance because new industries have replaced the old ones. For instance, Norwich was once the second largest city in the British Isles and then possessed a great woollen industry This industry has long since departed, but has been replaced by important manufactures of mustard and starch. Reading owes much of its modern importance in commerce to Huntley & Palmer's biscuit factories.

Ipswich, once an important shipbuilding town and port, still retains a small shipping interest and has developed a considerable manufacture of agricultural machinery, because it is one of the wheat centres of the Eastern Counties.

There are towns, also, where practically the whole business population is concerned with the manufacturing depots of the great railway companies—Crewe and Swindon, for instance

Now once every eleven years a record is taken of the population, this is called a "Census" A Government official, the Registrar-General, publishes the results and a report on them. From this "Blue Book," as such Government publications are called, much valuable information can be obtained concerning the distribution of population. The last Census was taken in 1911, and the figures show that—

1 The areas which had increased most in population since 1901 were the South Wales ports and the suburbs of London

2 Over nearly all Ireland the population is decreasing.

3 Over central Wales (Radnor, Montgomery, Merioneth) population is also decreasing.

4 The town whose population has increased the most is Coventry

You should think over these points and try to find the causes of them

Lastly, if you are interested in history, you should look at a map showing the distribution of population in the British Isles about 1720 A comparison with a present-day population map brings out some interesting points. You will see, for instance, that our manufacturing towns then were small and more or less scattered all over the country, but were mainly in the S E and S.W. The population was densest then, not round the coalfields, but along a belt extending from Bristol to London Why was this?

QUESTIONS ON CHAPTER XXIV

57 Suggest several reasons for the fact that the centres of Ireland and Wales are very thinly populated

58. Scotland and Ireland are nearly equal in size and population What difference do you notice between the distribution of population in the two countries? Account fully for these

59 Find examples of the following kinds of towns (do not use as examples any places already mentioned in this book).—

(*a*) At the junction of two rivers

(*b*) At the first place up a river where a bridge can be constructed

(*c*) At the limit of navigation up a river

(*d*) Commanding a coastal plain route

(*e*) At a place where a river can be forded

(*f*) A large port some distance up an estuary with an outport at the mouth

CHAPTER XXV

COAL, IRON AND STEEL

COAL-MINING is our most important industry, for on the production of coal depend all our manufactures In 1912 the quantity of coal raised in the United Kingdom was over 260 million tons, and the number of people employed on this work was over a million Being a manufacturing country, naturally we use up a large proportion of this output Allowing for this home consumption, we exported in 1912, 87 million tons of fuel We are, in fact, the greatest coal-exporting nation in the world

In a previous chapter we saw who are our chief customers in the trade, and how there is always a great demand for the particular class of coal known as "steam" coal It is due to this that Cardiff has risen to be the world's greatest coal-exporting port The coal that is consumed in this country is needed for various purposes—for household use, for all our manufactures (especially that of pig-iron) and for making coke In 1912, 33 million tons of coal were used for this latter purpose.

Much coal is also exported coastwise or by rail to places which are not situated near coalfields London of course, takes the biggest supply. In 1912 no less than 16 million tons were sent to an area within a fifteen-mile radius from Charing Cross. Over half this quantity came by sea from the ports on the north-east coast, the greater part of the rest came by rail from the Warwickshire, South Yorkshire and Nottingham coalfields A very small proportion

was canal-borne Much coal, also, is used by locomotives and steamers

There is no doubt that our country contains large resources of coal for future use, but exactly how much of it can be mined it is not easy to say, because some of the coal deposits lie at very great depths in places as much as 10,000 feet below the surface of the earth The greater the depth the more difficult it is to obtain the coal, both on account of the higher temperatures at such depths and of the difficulty of ventilating the mines.

Even now some mines are worked at great depths For instance, in one mine in Wigan coal is mined at 2445 feet, and another colliery near Manchester is over 3000 feet deep, and some of the South Wales mines nearly approach this depth At present it seems probable that it will not pay to mine seams of coal less than one foot in thickness and lying at depths below 4000 feet But new coal seams from time to time are being found at workable depths (*e g* the recently opened mines near Dover), and at this rate our coal supplies, even allowing for increasing consumption, should last us several centuries

Whether we retain our place as an exporting country depends on many factors, but largely on the efforts of our miners and the ease with which the coal can be extracted At present the U S A miner produces 660 tons a year, whereas our miners produce per man only 269 tons, and with shortened hours of labour will produce even less The U S A, however, consumes most of the coal she produces, and in any case will find that as time goes on her coal, which is at present easily reached, will be worked only with much greater difficulty.

When the iron-ore has been raised at home, or imported, as the case may be, it is reduced by heat to a molten mass which is cast into moulds or "pigs," whence the term "pig-iron" or "cast-iron." The

production of such iron in manufacturing countries is very large, and is a good indication of the importance of a country. Before 1914 the U S A Germany, France and the United Kingdom (in the order named) produced the greatest quantities

On the average it takes two and a half tons of ore and two of fuel to produce a ton of pig-iron Now such iron contains a certain amount of carbon and other impurities, and it is the carbon which makes cast-iron brittle. If, therefore, we get rid of the carbon we obtain a much harder kind of iron which we call wrought-iron

Steel is produced by smelting coal and iron, and usually lime or limestone, in a blast furnace, so called because the process includes driving a blast of very hot air through the mixture

There are various processes for making steel By some of these any phosphorus which is present, and which is injurious to the manufacture of good steel, can be extracted Some ores contain a very small percentage of phosphorus and are thus more easily manufactured into steel The particular kind of ore known as "hematite" is one of these There are extensive deposits of this ore near Barrow in Cumberland, and if we want more we import it from Spain or the Island of Elba off the coast of Italy.

Steel is manufactured for machines which have to cut very hard substances such as iron or steel Such cutting-steel has to resist great pressure and friction which generates very high temperatures. The ore used for the production of high-speed steel is known as tungsten or wolfram Deposits of it are worked in Cornwall, but much ore has to be imported.

The principal ore-producing centres in the British Isles are in order of importance East Midlands (*i e* Northants, Leicester, Lincoln, etc), Cleveland district, Cumberland, Staffordshire, Scotland (Central Plain)

The average number of blast furnaces working in 1912 was 312, the principal districts for these being — Cleveland (Middlesborough), South Wales (Newport, Swansea, Cardiff, Neath, Merthyr, Llanelly), Staffordshire, West Riding of Yorkshire (Sheffield, Rotherham, Leeds, etc), Cumberland, Central Plain of Scotland (Airdrie, Coatbridge, etc)

There are a few furnaces in the East Midlands at places like Kettering, but much of the ore raised in this area is sent to Staffordshire or Yorkshire to be smelted, as the coalfields are not associated with ore deposits.

Two things must be noted —

(*a*) The tendency to import more and more foreign ore, mostly from Spain and Sweden

(*b*) The tendency to place the smelting works at or near the large ports, so that the imported ore may be received on the spot and the manufactured goods easily exported

In this way we can explain the rising importance of the South Wales ports and the increase in their population noted in the last chapter.

Much of the Cleveland and Cumberland iron and steel is used for shipbuilding, so is the iron of the Scottish smelting-towns. Sheffield specializes in cutlery (excellent grindstones being made from the millstone grit of the adjoining Pennine district)

South Wales specializes in zinc and tin plating The zinc is used to cover steel plates and in this form is known as galvanized iron, and in a special form as corrugated iron, large quantities of which are exported to British India, Australia and the Argentine The special industries of the Black country were noted in the last chapter

In South Wales, too, lead and copper ores are smelted, Swansea importing large quantities of copper ore from the mines of the Rio Tinto area in Spain.

Much machinery of all kinds is made in the British Isles weaving and spinning machines, locomotives and rails (at Doncaster, Kilmarnock, Darlington, etc.), engineering and agricultural machinery, large quantities of which are exported to the Argentine, Russia and the Colonies

QUESTIONS ON CHAPTER XXV

60 In an outline map of the British Isles mark the chief coalfields and iron-ore districts Insert the chief iron-smelting districts and towns mentioned in this chapter

61 In the same map insert the chief shipbuilding centres with (S) after them Put in the following Government dockyards, write (D) after each —

Sheerness, Chatham, Portsmouth, Devonport, Pembroke Dock, Haulbowline, Rosyth, Dover

62 Where coal and iron do not exist together the iron ore is taken to the coalfields to be smelted Why is the coal not brought to the ore? What town mentioned in this chapter is an exception to this rule?

63 Gloucester has a considerable import of timber which is sent to the Midlands By what routes would it be sent and to what use might it be put?

CHAPTER XXVI

TEXTILES

THE term "textile industry" includes the processes of spinning, weaving, dyeing, printing, and, in general, the manufacture of all kinds of fibres—cotton, wool, hemp, jute, silk, flax, hair, etc This branch of industry is now so important that its products form one-half of the total value of exports from this country, the cotton industry alone accounting for over £100,000,000 worth

The growth of the cotton trade dates from the great mechanical inventions of the eighteenth century, which made rapid weaving and spinning possible and abolished almost completely the older and slower methods of the hand loom This industry in the United Kingdom is confined to three areas (1) Lancashire, (2) Scotland (Paisley and round Glasgow), (3) Nottingham and Leicester

The reasons for the distribution are, in the case of all three districts, (*a*) cheap coal; (*b*) geographical position

We must add a third reason in the case of the first two areas, namely: (*c*) damp climate, which is necessary for the spinning and weaving of cotton, since the fibres, especially the finer kinds, are apt in a dry climate to become brittle and break The Nottingham and Leicester districts have not such a moist climate, but in their case this does not matter, because they specialize in the manufacture of lace and hosiery, for which coarser and stronger fibres are required and in which the strain on the fibres in the

process of manufacture is not so great A large proportion of silk and cotton is used also in these districts, the silk thread being obtained either from France or from Cheshire and Staffordshire, and the cotton yarn from Lancashire

The raw cotton, as we already know, comes in bales from the U S A , Egypt, India and Peru, etc , and is imported into Liverpool and thence by the ship canal to Manchester Liverpool is the great cotton market and the distributing town for the raw material Manchester is the distributing town for the finished article

Oldham and Bury are the two largest spinning-towns and Burnley, Blackburn, Accrington, Nelson, etc , specialize in cotton weaving Many other towns also engage in the industry *e g* Stockport, Glossop and Rochdale

You should notice how the towns are well placed for communication across the Pennines via the Aire Gap so that it is easy to export cotton goods from Hull as well as from Liverpool In Scotland, Paisley has a similar geographical position and climate, and has become noted for its cotton-thread industry

Our exports of cotton are either manufactured goods of all kinds or yarns, *i e* thread But our industry is meeting with increasing competition In the coarser kind of cotton goods India is a rival, in the cheaper kinds Japan is a growing competitor; the U S A. is the most serious rival of all because she can supply her mills with the finest home-grown cotton.

Another industry akin to cotton manufacture is that of linen weaving from the flax plant This has been the main industry of the Belfast district for over three hundred years Flax is the principal crop in the north of Ireland from Londonderry to Belfast, but the crop is not large enough to supply the demand, and large quantities of raw flax are imported from Belgium (the Lys valley) and Russia. In Scotland.

also, there is a flourishing linen industry in Dundee, Dunfermline and other eastern towns, since the raw material can be easily imported from Russia. Dundee and some of the Tyne ports specialize in sailcloth In addition, large quantities of jute are received from India and made into sacks at the Dundee factories, and into these ports comes hemp (from Russia), Manilla, etc., to be made into ropes and rigging for shipping purposes

Another textile industry is that of silk. In this we have of late years suffered from foreign competition, but it is still carried on at Congleton and Macclesfield in Cheshire, at Leek in Staffordshire, at Coventry, Chesterfield, Norwich, Braintree (Essex), and round London (Spitalfields and Bethnal Green), where it was first introduced by the Huguenots.

We now come to the woollen industry, which, though not as important as that of cotton, nevertheless supplies work for some 300,000 people and brings in annually from the sale of exports about £40,000,000.

This industry, as we have already noted, is a very ancient one. In the thirteenth century the tax on wool sometimes formed part of the king's revenue and amounted to a considerable sum of money Even then we were manufacturing coarse cloths; but we did not learn to make the finer fabrics until the Flemish weavers came over here and taught us how to do it. In those days the S E. Midlands, the S W. and Eastern counties supplied the raw wool, and Norwich, Devizes, the Cotswold and Mendip towns were important manufacturing centres. Great fairs were held at places like Stourbridge, near Cambridge, and thither would come the Flemish weavers to buy the raw wool. An interesting document has been preserved which shows the importance of our Flemish connection. It is an order from Edward III himself to the Admiral of the Fleet telling him to provide an

escort of ships to convey from Ipswich across the Channel a party of Brabant merchants returning home from the Eastern Counties of England with their purchases of 2200 bags of wool.

The mechanical inventions (already noted) and the increased use of coal for power purposes caused the woollen manufacture to concentrate in the West Riding of Yorkshire. There, of course, the sheep on the Pennine pastures could provide a certain amount of wool To this day, then, Yorkshire has remained *the* woollen manufacturing area

Nevertheless, some of the old centres have managed to retain their industry

Wellington, in Somerset, manufactures khaki cloth, Stroud and one or two other western towns are still noted for their "broadcloth," especially hunting-coats, billiard-cloths and scarlet uniforms. In Gloucester and Somerset were grown large quantities of the thistle-like plant, the teazle, which is used for raising the "nap" on cloths, and this provided another reason for the industry remaining there

Witney still manufactures blankets, and in parts of Scotland and Ireland (the outer Hebrides and Donegal, for example) the best tweeds are still manufactured by hand. Roughly speaking, woollen manufactures may be classified as (1) woollens, (2) worsteds, (3) shoddy. In the first will be included blankets, flannels and tweeds; in the second serges and the finer cloths; in the third the cheaper grades of cloth used for ready-made clothing and manufactured from old waste clothing and rags.

As Liverpool is to the cotton industry, so is Bradford to the woollen market, and most of the wool imported into this country is sent to this Yorkshire town This town, then, is the distributing centre, but it also manufactures woollen yarns which it exports in large quantities. Other towns tend to specialize. Leeds—ready-made clothing; Huddersfield—serges; Halifax

—carpets; Rochdale—flannels; Hawick, Galashiels, Selkirk, Peebles—tweeds: Dewsbury, Batley—shoddy.

The shoddy industry uses up large quantities of wool, wool waste and rags. The cloth turned out is often surprisingly good, there is a large demand for it and thousands of hands are employed in its manufacture.

Carpets are made from coarser kinds of wool and are usually mixed with jute or some other fibre. There are famous makes of carpets: Axminster, Wilton, Kidderminster, Brussels, and so on But now these centres do not necessarily produce the carpets associated with their name Thus Halifax and Kidderminster manufacture Brussels carpets, and Dundee and Rochdale do likewise.

Lastly, we may note that mohair and alpaca (the hair of the animal of that name) are used for various dress, lining and braiding materials.

CHAPTER XXVII

SOME ASSOCIATED INDUSTRIES

COTTON and woollen and linen goods, of course, often require dyeing and bleaching, industries for which pure water is very necessary In this way we can explain, for example, the importance of Perth, where are situated well-known dye-works such as Pullars'.

Some dyes are made from plants (indigo) or vegetable fibres (*e g.* logwood), but now all dyes can be artificially manufactured by chemical means from coal-tar. Thus we may expect to find dye-works erected near chemical works and within easy reach of coal · recently important dye manufacturing works have been established at Ellesmere Port (Cheshire).

Yet another industry indirectly connected with cotton and flax is the extraction of oil from the seeds of these plants. Other plants and vegetable matter are used for the purpose. Thus the flax seed, commonly known as linseed, cotton seed, and rape seed are all pressed for oil, as are also the soya bean. grown in Manchuria and China, the seed of the castor oil plant from India, the outer husk and kernel of the oil-palm, a native tree of tropical West Africa, the ground-nut (known to boys as the monkey-nut) from the same locality, and the edible part of the coco-nut, which in a dried form is known as copra The coco-nut palm is widely distributed along tropical coastal plains and large quantities are imported into the United Kingdom from Ceylon, the East Indies and elsewhere.

Now the oil is extracted from all these products

mainly by crushing processes, and it is put to a variety of uses which we can tabulate as follows :—

1 Soap and candle making.
2. Making of artificial foodstuffs:

(*a*) For human consumption—margarine.
(*b*) For cattle—cake and meal.

3. Lubricating machinery.
4. Lighting purposes.
5 Manufacture of paints, varnishes, linoleum and oilcloth.

The oil-seed trade is very much larger and more important than most people imagine. Hull is the great centre of the industry; in fact, the quantity of oil seeds treated in the Hull mills exceeds that of any other place in the world.

These mills are situated along the River Hull, which has both its banks lined with them and with paint and varnish works. The seeds are imported direct to the Hull docks, loaded into lighters and towed to the mills into which their cargoes can be directly discharged.

In 1913 the value of cattle food in the form of cake and meal which was exported from Hull was worth roughly £400,000, and together with the export of oil, oilcloth, linoleum, fats and like substances brought in something like £2,000,000.

In the making of meal and cake linseed, cotton seed, rape seed and the soya bean are used. For margarine, copra, palm oil and palm-kernel oil are required. Paints and varnish contain linseed oil because it dries rapidly on exposure to air. The same oil is also used for oilcloth and linoleum production. All oils (except that from rape seed) are used for soap-making; castor oil is said to be most valuable for lubricating aeroplane engines.

In the soap trade all kinds of fatty and oily sub-

stances are used together with potash or soda, which are manufactured chemically Now chemical works employ for this purpose much common salt, a substance which also enters into the manufacture of glass, and in all these manufactures large quantities of coal are used. So you see here we have a very close connection between these industries (oils, soap, chemicals, glass), and we shall expect them to be established often very close to one another.

The chief deposits of salt have already been noted in Chapter XVII. So the distribution of our industries we are discussing runs as follows .—

Soap—Port Sunlight (Lever's works) on the Mersey near Birkenhead

Glass—St Helens (Lancs), Middlesborough, Stockton-on-Tees.

Chemicals—Widnes, Runcorn, St. Helens, Northwich (Brunner & Mond's works), Flint.

An example or two will make the connection plain.

Lever's works import their raw material of copra, oil, etc , direct by steamer up the Mersey. Lancashire coal is close at hand, and the potash and soda may be obtained from Widnes, say, which is distant only a few miles

Again, the glass works of St. Helens obtain their coal practically on the spot, their chemicals in a like manner, and the silica, necessary for glass-making, from the sandstones of the Cheshire plain.

We might almost have included the pottery industry with the others we have been discussing, for cheap coal, salt and chemicals are also wanted here. Thus we usually find the pottery districts in touch with coal and salt supplies. Look at a map showing the pottery district of Staffordshire. It is on a coalfield and within easy reach of salt and chemical supplies, the china-clay (kaolin), which is granite decomposed by weathering, is exported from Cornwall to the Mersey and then sent to Staffordshire by either

rail or canal. Worcester china is obviously connected with the deposits of salt at Droitwich. The Staffordshire towns of Hanley, Burslem, Etruria, etc., have been so long noted for their china ware that they are grouped together and known as "The Potteries." It was in this district that Joseph Wedgwood first made the china for which his name is famous

QUESTIONS ON CHAPTERS XXVI AND XXVII

64 Explain carefully the reasons which have led to the cotton manufacture being established in Lancashire, and to Manchester's being the centre of the industry

65 What are the three great sources of Lancashire's supply of raw cotton? By what routes do the supplies reach Liverpool?

66 By what routes can cotton goods be exported from Manchester? By what routes can woollen goods be exported from Bradford westwards?

67 Wales has many sheep but few woollen manufactures Why is this? Welshpool and Newtown (Montgomery) engage in the woollen industry. Whence and how can they get their coal supplies?

68 The following towns are engaged in dyeing, printing and bleaching and require a good supply of pure water. Find them on a map and say whence they draw their water supply:—

Perth, Macclesfield, Stroud, Accrington, Bacup, Leek, Belfast.

CHAPTER XXVIII

WHEAT

WHEAT is our principal food It is estimated that the population of the British Isles requires a total supply of wheat annually of some 35 million quarters; and the questions for us to consider here are, from where does it come, and how do our millers obtain and transport to their mills such vast quantities? It is true that we import a certain amount of flour but the quantity is so insignificant when contrasted with the imported raw grain that we can here neglect it and confine ourselves exclusively to the latter.

It is clear that two sources of supply are open :—

1 Our home-grown wheat.
2 Foreign wheat.

Let us deal with our own crop first, as in doing so we shall find a solution of the important question why our farmers cannot supply enough wheat to satisfy the needs of our large population

At one time our home-grown supplies were sufficient for us, and in fact in favourable years we actually exported a certain amount. But we have not been in this happy condition for years—why not? Briefly the reasons are these —

1. Competition of foreign countries which can produce, owing to superior climatic and physical conditions, much greater supplies than ours and at a lessened cost

2. The consequent lowering of price which has discouraged English farmers.

3. The rapid growth of our population, which has outgrown the means of supply.

4. The cheapness with which wheat can be imported from abroad. In this connection it is a significant fact that as a rule the great wheat mills are situated at the seaports.

5. The growth of factories which have attracted large numbers of agricultural labourers to the towns, where they can earn higher wages than they can in the country districts.

Now possibly a larger crop might be raised by farming on more scientific principles and by a greater use of mechanical contrivances. But we must remember that, generally speaking, our climate is not suitable for wheat, and, again, that the small fields of an English farm are very different from the rolling expanses of prairie in North America or Russia, for instance, and are therefore much less adaptable to the use of machinery on an extensive scale.

From all this, then, we learn that we must look to foreign countries to furnish the greater bulk of our annual wheat supply But before we consider foreign supply, let us glance at that of our own islands.

In Chapter IV we discussed the essential factors for successful wheat growing, and on further examination we find that these conditions obtain only in the Eastern Counties of England. The counties of Lincoln, Essex, Norfolk, Suffolk and Cambridge have the greatest acreages under wheat and produce the best crops. A miller, then, might reasonably expect to draw upon these counties for a portion of his wheat supply, but as the supply of English wheat is limited he must import large quantities from one or more of the following areas: India, U.S A., Canada, Australia, Argentine, Russia.

We know that wheats vary in kind (Chapter IV), and that the wheat harvests of the world do not occur

simultaneously Moreover, prices vary, as also do crops, and if the crop fails, say, in Australia—as it did, in fact, owing to drought, in 1903—the consequent loss of imports to this country must be made good by larger imports from, say, India or Canada.

All these factors must be taken into account by millers and corn merchants before orders are placed and sales effected Let us take an example and see how the theory of wheat supply works out in practice.

A miller in Hull has his mills situated on the little River Hull, tributary to the Humber He places an order with a corn merchant for so many quarters of wheat from, say, India, Russia and Canada The wheat will come, we presume, from the Punjab, the Black Sea region, and Manitoba respectively. We require to know the transport route in each case.

With the aid of an atlas we may work out the problem as follows: in the case of India the wheat will be grown in the Punjab in the cool winter months, and will be shipped from the port of Karachi, reaching us in the early summer months The supply will reach Karachi from the Punjab apparently by one of two routes, viz by boat down the Indus or by rail along the Indus valley. Obviously water carriage is most desirable, but in this case is not possible, owing to the difficulties of navigating the river. Hence this supply will reach Karachi by rail and will be shipped from there direct to Hull.

In the case of Russia, the wheat is grown in the fertile black soil region of Southern Russia, and will be shipped direct to Hull from Odessa or Nikolaev.

Assuming that both cargoes arrive safe and sound at the Hull docks, how do they reach the mills? In this particular example we have assumed that the mills are alongside the River Hull. The process, then, is simple The wheat will be transferred from the cargo steamer to steel barges or "lighters" which

will be towed up the river and which will discharge their cargo, by means of an elevator, directly into the mills.

Here, then, is emphasized the importance of building your mill at or near the docks. You save the cost of transport to an inland town. Large mill owners in Hull, for instance, have shut down their branch at Leeds and have built bigger premises at Hull simply to save the cost of inland transport

Now to finish our problem. We have still the Canadian cargo to account for Here the solution is not quite so simple. The following routes suggest themselves. The working out of the most probable and desirable route we leave as a problem to the student, who should have no difficulty in arriving at a satisfactory answer if he bears in mind the vital principles of transport which he has already learnt. The routes are —

1 Via the Great Lakes to Buffalo; thence by rail to New York, Baltimore or Philadelphia.

2 From Buffalo by waterway to the nearest convenient port.

3. Via the Great Lakes and the St. Lawrence, making use of the Welland Canal.

In any case, from whatever port it is shipped, the cargo will reach Hull direct, and will be dealt with in the same manner we have already described.

The home supply the miller will have no difficulty in obtaining. Lincolnshire is just the other side of the Humber, and the supply can be brought by water the whole way.

Another example of the transhipment question might be taken which would present some new and interesting problems for us to solve.

By what route will a cargo of wheat from Australia reach Liverpool?

There are three possible routes .—

1 Suez
2 Cape of Good Hope.
3 Cape Horn.

Here we have a new set of circumstances to take into account, such as —Canal dues, prevailing winds, coaling stations, ocean currents, distance, etc And, of course, Argentine shipment problems could be treated in a like manner

Let us conclude by seeing how the wheat ultimately becomes flour.

Briefly what happens is this the wheat is first weighed, and after being cleaned free from dust, chaff, etc, is stored in a special building called a "silo," which is divided into immense bins. some of them being as deep as 80 feet, and each capable of holding over 100 tons. From the silo the wheat is transferred by mechanical means to the actual milling machinery, where it undergoes treatments varying according to the kind of wheat used. The processes gone through include cleaning, washing, rolling, drying, etc. Finally the wheat, which by this time has become flour, is passed through a flour-dressing machine and is then ready for packing or storage.

QUESTIONS ON CHAPTER XXVIII

69 The following are possible routes for transport in the future —

(*a*) A canal from Georgian Bay via Lake Nipissing and Ottawa River to Ottawa

(*b*) Winnipeg to Port Nelson (Rail or water?), thence via Hudson Bay, etc, to Liverpool Discuss fully the advantages and disadvantages of exporting wheat from Canada by them, and draw a diagram showing all the routes mentioned here and in the text

70. What conditions are necessary for successful wheat growing? What parts of the British Empire are important wheat producers?

71 Discuss the advantages (or disadvantages) and means of increasing our home-grown wheat supply. Discuss the question from the point of view of (*a*) the farmer, (*b*) the agricultural labourer, (*c*) the State

CHAPTER XXIX

FISH AND LIVE STOCK

FISH is an important article of food Our annual consumption of fish is said to be about 830,000 tons, or 40 lbs. per head of the population

Among a seafaring nation like ourselves it is natural for fishing to be a very old-established and extensive industry Extensive, because directly, or indirectly, it leads to the employment of many thousands of workers—fishermen and shipbuilders, makers of sail-cloth and ships' stores, nets, boxes and barrels.

Our chief fishing grounds are —

1. The North Sea—particularly the Dogger Bank
2. The seas round Iceland and the Faroe Islands
3. The White Sea.
4 St George's Channel.
5 Off the south of Ireland
6 Off the west of Scotland.

Some fish, like the herring, mackerel and pilchard, are "surface" fish Others, like the various flat fish (turbot, plaice, soles, etc), are found on the bottom of the sea and are called "bottom" fish The former are caught by "drifters," and the latter by "trawlers"

Both these classes of boats are about 100 feet long and employ a crew of from five to thirteen men. The drifters let down a huge net a mile or two long and tow it along, raking in on the way any surface fish there may be The "trawl" is a net dragged along the bottom of the sea and gathering up the bottom fish.

The chief catch round these shores is herring, but, as a large quantity of this is exported to the Continent, our principal fish supplies are from bottom fish and cod, the latter of which is caught by hook and line.

The fish appear to migrate according to the seasonal variations in the saltness and temperature of the sea water. Thus the herring breeds, or "spawns," all the year round, and moves south as the season advances, so that the herring-fishing season is earlier off our north and north-east coasts than it is further south We could do with a good deal more information about the habits and migrations of fish round our shores, and there are many people who think there ought to be a "Ministry of Fisheries" established to look after the fishing industry. We can probably learn something from the U S A in this respect.

As our chief fishing ground is the North Sea, our chief fishing ports are on our eastern shores Grimsby, Hull, Yarmouth and Lowestoft in England, Peterhead, Fraserburgh, Wick, Leith in Scotland, Lerwick in the Shetland Islands,—add to these Stornoway in the Outer Hebrides

In addition, the mackerel fisheries off Wales and the pilchard fisheries off Cornwall are of some local importance

The big fishing ports have their own fleets of trawlers and drifters, which are owned by shipmasters or companies and which do a large trade. In fact, the amount of money realized in exports of fish is probably much larger than you would suppose

We give a Table of figures from the 1913 Board of Trade returns which will give you some idea of the extent and value of the fishing industry —

VALUE OF FISH EXPORTS FOR VARIOUS PORTS IN 1913

England	Value in thousands of pounds	Scotland and Shetland Islands	Value in thousands of pounds
Yarmouth	1,313	Leith	429
Lowestoft	849	Fraserburgh	316
Hull	636 (imports)	Stornoway .	297
	179 (exports)	Lerwick .	272
Grimsby	532	Peterhead	269
		Wick	223

Some fish is salted or cured. Herrings in this state are known as bloaters The bloater industry of Yarmouth brings in annually any sum of money up to a million pounds Much salted fish (herring) is sent to the Continent. In 1913 we exported 44 per cent of the total catch, and for home consumption London took £1,300,000 worth

Then, of course, we must not forget that we add to our own supplies by importing large quantities of tinned and canned fish from the U S A and Norway.

It is interesting to note in the Board of Trade returns the large quantities of timber, rough and prepared, which are imported by the fishing ports for the making of barrels and boxes in which to pack the fish for transport If for any reason the supply of timber were to fail for any length of time, it is quite certain the fish export trade would come to a standstill This shows how one industry may be dependent on another.

We said that London imported large quantities of fish Let us take the London trade as an example of how the fish is distributed from the ports to the various districts

The perishable nature of fish makes necessary the arrangement of special measures for quick transport and prompt delivery. It is essential that a fish-train should be as punctual as an express passenger train; so the rail companies make every effort to maintain a punctual service and get the fish fresh to the markets.

This is how it is done in practice :—

When the trawlers arrive with their catch at Grimsby they find a G.C R fish train already drawn up alongside the wharf. The fish is loaded into the special vans as rapidly as possible At 5 30 p m the first fish train leaves for Marylebone station, London, where it arrives just after midnight Its contents are immediately unloaded into waiting vans, which

convey it to Billingsgate market in time for the early morning sales.

The G.C.R. in this way carries 35,000 tons of fish annually to London.

But, of course, this is only one way of transport. Much fish is also sent direct from Hull to London by sea, or to Liverpool by rail. Fleetwood is another port for distribution, and the L. & Y. Railway are extending their fish-dock accommodation there.

The experiment, also, is being tried at Hull of supplying the large outlying area with fish by means of quick motor-transport.

Another form of food is meat, our supplies of which are either home produced or imported. You can think of the cattle- and sheep-rearing districts, and so arrive at the sources of supply. Every one knows Wiltshire hams, York hams, Welsh mutton. Irish bacon and hams are sent in large quantities from Cork or Wexford to Bristol, Cheshire beef may be sent to London, and so on.

Here we want to see whence we get our foreign supplies. The chief sources of imports are:—U.S.A., Argentine and Uruguay, Australia and New Zealand.

The foreign meat trade is, of course, a very modern one, and has only been made possible by the ingenious methods of "freezing" or "chilling" meat so that it will stand the long sea voyage through the tropics and arrive here in good condition.

In 1913 the Argentine exported nearly £10,000,000 worth of meat to the British Isles. New Zealand "Canterbury" lamb is in great demand, and Australian mutton hardly less so. The U.S.A. supplies us with large quantities of hams, pork and bacon, mostly from the Chicago district. Canadian bacon is coming over in increasing quantities, and eggs are imported in large numbers from Russia, North

America, Italy, etc. Denmark is another important source of supply for dairy produce of all kinds.

The meat trade naturally is associated with the leather trade, because the various animals supply hides, skins and bristles. The last named are required for brushes; the former mainly for (1) Fancy leather trade, (2) Boots and shoes, (3) Saddlery and harness.

British India, U S A, Argentine are the main hide exporters.

Australia and New Zealand supply sheepskins; Italy, Asia Minor and India goatskins.

To these must be added our own home supplies, especially from the pastures of the Midlands, which, together with facilities for communication, have caused our boot and shoe industries to centre in Northampton, Stafford and Leicester.

Large imports of ready-made footwear come from the U S A. and France, and the latter country also supplies us with the best leather gloves Germany was our principal source of supply for the fancy leather articles.

We have already noted in a previous chapter our own manufactures of harness and saddlery. Another industry, that of tanning, is naturally connected with animals and hides. Leather has to be prepared, or "tanned," before it can be used for manufacture.

Most of the tanning materials are vegetable matter, various kinds of shrubs and trees yielding the necessary tanning acids. The principal ones used for the purpose are:—

Spruce hemlock from North America
The wattle (a species of acacia) from Natal
Myrobolan (a kind of nut) from India
Quebracho, a shrub from South American plains
The mangrove tree.

This last-named tree is especially interesting because it grows in the unhealthy swamps of tropical

deltas, and was formerly considered to be one of the few trees absolutely useless for commercial purposes.

Very often where tanneries exist we shall find other industries dependent on the raw animal products used in the tanneries. Thus fats and oils from the carcases are of use for soap-making, hoofs supply material for glue In this way a town—like Bristol, for instance—may manufacture boots and shoes and also contain tanneries, soap and glue works

CHAPTER XXX

TRADE WITH THE TROPICS

We have noted in previous chapters many facts about the distribution and commerce of tropical products We must now collect these scattered facts and put them into a more connected form

We are here dealing mainly with agricultural areas. Tropical nations are not, as a rule, engaged in manufacture We can expect, therefore, our imports from the tropics to be largely composed of tropical agricultural and native vegetable products and our exports thither to be mainly manufactured articles.

Now the area within the tropics consists of three types of regions —

I. The hot and wet forest of either equatorial or monsoon type

II The more temperate uplands, mainly on the sheltered side of mountain ranges and in the interior of continents.

III. A portion of the desert areas of the world *e g.* part of the interior of Australia, part of the Sahara; part of Arabia, the rainless coast of Peru

Dealing with these in more detail and taking Area I. first, we shall find that here we have the usual tropical vegetable products distributed according to the principles of climate and soil, etc, laid down in our earlier chapters, to which the student is advised to refer for revision purposes

Rubber is important and will be exported to London from Brazil, West Africa, Ceylon, the East Indies,

etc. Para, the West African ports, Colombo, Singapore, will be the ports of shipment.

Sugar will be even more important, and will come mainly from British Guiana (Demarara), the West Indies, Brazil (Pernambuco, Bahia), Java (Batavia), Queensland (Brisbane), Peru (Callao), Mauritius. There are sugar refineries in Greenock and Bristol, so that we may expect some of the imports to be sent to the Clyde and the Bristol Channel (Avonmouth); and London, of course, will account for most of the remaining cargo.

Cacao, coffee, bananas and timber (mahogany, cedar, dye-woods) are typical exports from Central America and Mexico. All these states export such products. Costa Rica coffee is well known for its superior quality, and large quantities are shipped from Limon to London. A large trade in tropical fruits, particularly bananas, is carried on between the West Indies, Central America, Brazil and such ports as Liverpool and Bristol, the last-named port being well served in the banana trade by Elders and Fyffe line of steamers. Besides Limon, other exporting ports are Tampico, Vera Cruz, Greytown, Belize, Porto Barrios, Porto Cortez, etc. The more northern states of South America also trade in these products, and there is a large export of cacao from Ecuador and in a lesser degree from Venezuela and Colombia. In West Africa and the East Indies cacao-growing is important, some of the finest beans coming from the island of San Thomé in the Gulf of Guinea We might expect this product to be shipped to Bristol, for instance, because important cocoa and chocolate works are situated there.

Coffee will come also from Brazil and will be shipped from Rio de Janeiro and San Paulo (Santos).

Coco-nuts and copra are imported from most tropical islands and coastal plains and from the same type of region (especially West Africa) will come ground-nuts and the fruit of the oil-palm. As we saw in a

previous chapter, the bulk of these imports will go to Hull.

Other important products will be tea, shipped to London from Colombo and Calcutta; rice from Rangoon: teak from the same port and from Java (Batavia)

There are some interesting minor products —

Sisal hemp from Manila and Mexico (Yucatan); arrowroot from Jamaica, vegetable ivory (for buttons and umbrella handles) from the north of South America and some of the Pacific islands, asphalt from the asphalt lake of Trinidad; quinine, a product of the cinchona tree, from the Eastern Andes, pepper and spices from Southern India and the East Indies; alluvial tin from the Malay States and the Dutch East Indies, petroleum products from the oil refineries of Rangoon

Lastly there will be cotton from Brazil, the West Indies and Peru Such are some of the imports into these islands from a portion of the tropics, but we have by no means exhausted the list

Area II.—From the interior plateaux of savannah type the main export will be hides On the edges of such plateaux we shall find mining of importance. Thus Bolivian tin is important, the interior of Queensland produces gold (Mount Morgan) and copper (Cloncurry, Mount Morgan); the interior plateau of Mexico is rich in many minerals, especially in lead and silver, and we must add the cotton of India from the Dekkan plateau

Area III, from the nature of the country, cannot send us much, but we may note dates from the Sahara and Arabia and various gums and resins (especially gum arabic) from the Sudan.

As we have mentioned before, the irrigated coastal plains of Peru produce sugar and cotton.

The main lines of shipping serving these tropical trade routes have already been detailed in Chapter XX.

It is important to notice that much of the traffic is not direct. A cargo steamer does not necessarily sail direct from an English port to a South American port, for instance. Our exports to South America are mainly coal, cement, machinery and a certain amount of miscellaneous manufactured goods. Of these coal is by far the most important and forms probably about 70 to 80 per cent. of the total exports to the countries round the Caribbean Sea and to South America.

The imports of tropical products are not of a bulky nature nor are they very large in quantity. Thus ships returning direct from South America (excluding the Argentine) are not likely to be fully loaded, and what happens might be this:—

A ship might sail direct to Brazil, say, with a full cargo of coal destined for, say, Rio de Janeiro. Having discharged her coal the vessel might load coffee and perhaps some tobacco and hides. Even then she would not be nearly fully loaded, so she would steam north to, say, New Orleans, discharge some or all of her coffee there and load instead with a cargo of cotton for Liverpool.

Or perhaps a steamer from a British Isles port will carry a certain amount of cargo to some port on the eastern coast of the U.S.A., and having there discharged it will load with U.S.A cargo for South America and return to the British Isles with wheat, say, from the Argentine.

Trade with West and South Africa is largely governed by similar considerations, so that vessels instead of returning direct from, say, Cape Town, may return via the Suez Canal in order to pick up, for example, a full cargo of cotton at Alexandria.

Transport, you see, is a complicated business, and is dependent on circumstances much more intricate and various than a map of the trade routes would lead one to suppose.

PART III

A —EUROPEAN TRADE ROUTES

CHAPTER XXXI

EUROPE NORTH OF THE GREAT MOUNTAIN AXIS

A GLANCE at a map of Europe will show that there is a great mountain barrier stretching from the Pyrenees to the Black Sea which roughly divides Northern from Southern Europe. Moreover, we can see that the great coalfields and, therefore, the great manufacturing areas lie north of this line In this way Europe is divided into :—

A. Europe north of the mountain axis
B The Mediterranean and Black Sea area.

In this chapter we shall deal only with Area A.

Coming to a more detailed examination of this region, we find that the northern part of it consists of Scandinavia and a great plain stretching from France to Russia South of this lies a region of basins and plateaux

At first sight this division seems very convenient. But from the point of view of trade routes it is deficient and we shall have to modify it We must make it include, first, Switzerland, whose import and export trade is carried on through the ports of Northern Europe; secondly, those parts of France and Spain the outlets for the trade of which are the Atlantic ports, and, thirdly, Austria-Hungary and the Balkan States, whose trade belongs mostly to the routes of Continental Europe but partly to the Mediterranean.

Portugal, producing typical Mediterranean products, will be more conveniently dealt with when we consider the Mediterranean area.

First let us locate the coalfields. They are:—

The Franco-Belgian coalfield, stretching from the French frontier to Aachen.
The coalfields of Germany—Westphalia (Ruhr), Saar Valley, Silesia, Saxony.
In Austria—Bohemia
In Poland—near Lodz.
In Russia—near Moscow (Tula). } Relatively unimportant

Excluding the last two areas, we may say that these regions are the principal manufacturing ones, and their products will be transported either via the northern ports or by rail and canal east or west; as the country is flat, communications good and transport easy.

Taking, then, area A in detail, we have, first, the mountain-mass of Scandinavia, and, on the other hand, the agricultural and pastoral regions of Holland, Denmark, North Germany, Russia and South Sweden.

The latitude does not suggest wheat-growing, but rather the cultivation of the hardier cereals—barley, rye and oats. Holland, Denmark, Russia, and South Sweden in a lesser degree, are obviously suited for dairy farming. There will be, then, a general export of these food products and a general import of raw minerals and manufactured goods.

Further, we find that these districts also produce much beet sugar. Germany is the great producer and the centres of the industry are at Halle and Magdeburg. The Netherlands also export much sugar, either unrefined or refined. The latter is, however, largely cane sugar obtained from their East Indian colonies and exported thence into Amsterdam where the refineries are situated. Northern France and

Belgium have large areas under beet cultivation, with refineries at Lille and Antwerp.

Much timber is exported from Norway, Sweden, Germany, Finland and Russia. Riga is an important timber port Forests along the Duna River supply the wood, which is made up into rafts and floated down the river to Riga where the sawmills are situated.

A great deal will be exported to the British Isles, some to Belgium for pit props and some to Holland and Denmark Half our imports of pit props and sawn timber come from Russia. Norway naturally exports fish in various forms and much of this is sent to the Roman Catholic countries.

Flax is grown on a large scale in the Lys Valley (Belgium) and in the Baltic provinces (especially Pskov) of Russia, which also produce hemp. Riga is the main port of shipment.

Copper ore is mined at Fahlun (Sweden) and is exported from Gefle. The iron ore of Gellivara is shipped from Lulea and in winter from Narvik. Much of this is sent to the U K and some is sent to be smelted at towns on the Ruhr coalfield, which is reached either via Antwerp or via the Ems canal to Dortmund By this canal also come ores from Spain. The U.K. also import much iron ore from Norway and smaller quantities from N. France and Belgium. Luxemburg ore is sent either east into France or west to Germany.

As to the movements of the coal traffic:—We have previously seen that Germany is the only country of Continental Europe which can export coal—annually she exports some 20 million tons, and, as we should expect, this coal will go either to countries like Austria, France, Belgium and Russia, which cannot produce enough for their own needs, or to countries like Italy, Switzerland, Holland and Denmark, which have little or no coal. As a matter of fact the bulk goes to Belgium, France and Holland. Italy and Denmark receive small quantities. The overland routes to

Italy are not advantageous for heavy traffic, coal being much more easily obtained direct by sea from the U.K. Denmark and Scandinavia get the bulk of their coal supplies from the East Coast ports of the British Isles. The remainder of our heavy coal exports to the Baltic goes to Russian ports. In 1913 our exports of coal to Scandinavia, Russia, Denmark and Germany amounted to well over 20 million tons.

The fact is that our trade with the North Sea and Baltic ports is largely concerned with—(1) The export of coal, coke and manufactured fuel; (2) The carrying trade between North and South America and Northern Europe; (3) Return cargoes of timber and other forest products from Scandinavia and the Baltic.

The coalfield of the Rhenish provinces and Westphalia is the most important one in Continental Europe. Dortmund is the mining centre. Much of the coal is used in the various large manufacturing towns of Germany and is therefore sent up the river for distribution, but much is also sent down the Rhine or by rail for export to Holland, Belgium and France. The carriage of coal on the Rhine is 45 per cent. of the total traffic on that river. Berlin and the towns in East Germany naturally get their supplies from upper Silesia. The various factories in Hamburg import Westphalian and British coal. In fact, our coal more than holds its own in the competition: *e. g.* in 1913 it formed 57·10 per cent. of the total imports of coal into Hamburg, Westphalian coal accounting for the remaining 42·90 per cent.

So far we have dealt mainly with raw materials. We have now reached a point where we may suitably consider manufactures. Let us begin with Germany, as it is the chief manufacturing country of Continental Europe.

The Rhenish provinces and Westphalia naturally form the busiest commercial area. Transport is easy in all directions. Goods can be dispatched by

rail equally well either eastwards or westwards, or they can be sent north via the Dortmund-Ems canal, down the Rhine to Rotterdam and up the river to Strassburg, and thence by canal into France or by rail to Switzerland

Conversely, imported raw material can be shipped into the heart of the mining districts or further to Mainz, Frankfurt-on-Main, Strassburg and, within limits, even to Basle.

In this way (*a*) iron ore, as we have seen, travels via the Ems canal, (*b*) raw cotton from the U S A. reaches such towns as Dusseldorf and Elberfeld; (*c*) raw wool from Australia and the Argentine reaches Barmen, Aachen, etc , (*d*) Crefeld imports raw silk.

Krupp's ordnance works are at Essen, Solingen corresponds to our Sheffield, Elberfeld has the greatest chemical factories in the world; Bielfeld specializes in linen, Dusseldorf has the largest glass bottle factory in the world, and any number of towns, such as Mulheim, Oberhausen, Remscheid, Bochum, Duisburg, Ruhrort, have blast furnaces and iron and steel works.

Population is dense but well distributed. For instance, no town has more than half a million inhabitants, but many have between one hundred and two hundred thousand people, the thirteen towns mentioned above having distributed among them a population of two million.

In Saxony Chemnitz is the great textile town and manufactures cheap German hosiery on a large scale, much of which (about £700,000 worth) is exported to the United Kingdom, and also machinery which is used, for instance, in the cotton-spinning mills there

Silesia is rich in minerals, especially in coal, zinc, iron ore and lead. Breslau is the centre of industry and turns out machinery and woollen goods, the raw material for which is either obtained from the Silesian sheep farms or imported.

Zinc is mined at Konigshutte, but much prior to 1914 was imported from Australia, since German syndicates controlled the output of the Australian zinc mines at Broken Hill (N.S W.) Thus we obtained much of our own Empire-produced zinc via Germany.

There are linen manufactures also in Silesia, as raw flax can be easily imported from Russia.

Extensive salt deposits in Germany have led to the manufacture of glass and china (*e. g.* near Dresden), and especially chemicals of all kinds for scientific, textile and agricultural purposes. Stassfurt is a well-known centre of the salt industry.

As we have noted so many times before, communications in Germany are excellent. The rivers are navigable for considerable distances (refer back to Chapter XI), canals are well developed and railways thoroughly link all parts of Germany with each other and the adjacent countries.

"Nodal" points are obviously Berlin, Frankfurt-on-Main, Leipzig, Breslau, and other towns too numerous to mention. The Rhine river ports engage in an extensive commerce and in 1910–1912 loaded nearly 60 million tons of goods and coal. The chief seaports are Emden, Bremen, Hamburg, Lubeck, Stettin, Danzig, etc. Notice how many of these have outports. Thus Bremen has Bremerhaven, Hamburg has Cuxhaven, and so on. You should notice, too, the course of the Kiel canal

Hamburg has a population of over a million, and carries on an enormous trade, much of which is with the United Kingdom. From it we receive large imports of sugar, glass, chemicals and machinery, and send there in return principally coal, coffee, cotton and woollen goods. In 1913 the tonnage entered and cleared at Hamburg exceeded 28 million tons; Bremen, the next largest German port, claiming but 10 million tons. This is a convincing proof of the superiority

of Hamburg over other German ports. The following figures show in round numbers some particulars of the trade at this port for 1913 :—

Exports, £ value		From	Imports, £ value
Sugar .	8,000,000	U S A	36,000,000
Coco-nut oil	1,390,000	U K	30,000,000
Machinery	884,000	British India	22,000,000
Hosiery	780,000	Argentine	15,000,000
		Brazil } Russia }	12,000,000

The exports of machinery go mainly to Russia, South America and Belgium. The coal imports come from Hull and the Tyne ports. There is a considerable traffic along the Elbe. In 1912, for instance, $4\frac{1}{2}$ million tons went down the river and nearly 6 million tons for distribution went up the river. There is also much coastal traffic with other German ports

Bremen is an outlet for textile manufactures and carries on a large trade with other German and European ports, the U S.A. and Great Britain In 1913, her trade was valued at £139,000,000. It has, also, a great import trade in tobacco.

Emden exports mainly coal and coke, and imports iron ore.

Lubeck exports pig-iron, textiles and cement, and imports iron ore from Spain and Sweden, timber from Sweden, Russia and Finland.

There is much traffic along the Elbe-Trave Canal.

Rostock, Stettin and Danzig deal with the typical agricultural exports of the Baltic plain, viz. beet sugar and oats.

So much for Germany. Let us now turn to the remaining manufacturing countries of the North European plain, namely, Northern France, Belgium and Russia

North France and Belgium both have coal and ironfields (see Chapter VI), and therefore manufacture

much the same kind of goods. The flax of the Lys Valley in Belgium supplies the linen factories of Ghent, Courtrai, Tournai, Lille and Cambrai. Raw cotton is imported through Antwerp and Dunkirk and is manufactured into goods at Rouen, Lille and Ghent. Lace is made at Valenciennes, Brussels and Mechlin. The sheep runs of Picardy supply the woollen mills at Roubaix, Turcoing and Amiens; and the "downs" of Champagne similarly supply Rheims, but much raw wool is imported from the Argentine, as the home supply is not sufficient.

The iron-smelting districts of this part of Europe have already been noted in Chapter VI. Dependent on these is the machinery manufacture of such towns as Liège and Lille.

The trade of these regions finds its outlets and inlets at Antwerp, Rotterdam, Amsterdam and Dunkirk The last-named port doubtless owes its rise to this fact, but the other ports, owing to their geographical position, have long been of importance as distributing centres. Amsterdam trades in timber, coal and grain, which it imports in large quantities. It is also the headquarters of the diamond industry, the trade in which is largely with the U.S A.

Antwerp is opposite the Thames mouth, is on the navigable Scheldt River and is connected by a network of canals with the Meuse, Seine and Rhine. Its trade approaches that of Hamburg in volume. It receives German and Swiss exports and imports.

Rotterdam is the natural outlet for the Rhine valley, so that a considerable percentage of Great Britain's imports from Germany come through this port. It is also a port of import for the grain of Switzerland.

Among the imports are yarns and woollen goods from the United Kingdom, and coal, cotton and woollen goods, iron manufactures, etc., from Germany.

Coal is re-exported to Belgium, and metals, unmanufactured and wrought, to Germany, Belgium, Great

Britain and the Dutch East Indies. From the latter (especially Java) it imports large quantities of tobacco and cacao, both of which are re-exported either raw or as manufactures. The average total of shipping entering and clearing at Rotterdam is about 20 million tons, of which one-fifth is British.

We will now turn our attention to the eastern portion of the North European plain Obviously the region is mainly an agricultural and pastoral one. The principal exports will be, therefore, raw materials such as eggs, timber, flax and hides from Riga, and oats, timber, skins and linseed from Libau. Both ports import coal from Great Britain and Westphalia, and herrings from the Dutch and British East Coast ports. In addition, Riga has tanneries, and therefore imports South American quebracho, and also machinery and chemical manures for agricultural purposes. Metals, cotton and copra also figure on the import list

We saw in Chapter V that Russia produces large supplies of cotton. This is manufactured in various forms at Moscow, Lodz, Petrograd, Riga, etc. Many of the mills are either managed or owned by Englishmen. For instance, the well-known Scottish firm of Coats had, before 1914, mills at the last three mentioned towns. In fact, in 1913 Russia had over 9 million spindles working and was reckoned fourth in the world's cotton list.

She also manufactures linen, woollen and felt materials at Moscow and in the Baltic provinces At Petrograd there are jute and hemp manufactures. Hemp is home-grown but jute is imported.

The northern ports, such as Archangel, export timber, pitch, resin and tar.

There seems to be a prospect that some day a regular trade may be opened up with Siberia via the Kara Sea and the Obi and Yenesei Rivers

In this particular it is interesting to learn that in

1913 the Anglo-Russian-Norwegian Co. sent a steamer by this route to the Yenesei and brought back to Immingham docks a cargo of Siberian produce. The experiment was repeated later, and two steamers of 3100 tons and 2100 tons respectively imported to Grimsby £350,000 worth of butter, hemp, flax, etc.

In the summer of 1919 yet another expedition was organized. A steamer from Liverpool took out a full cargo of miscellaneous British manufactures, including textiles, steel goods, hardware and clothing, which was transferred to barges on the Obi and thus dispatched into the heart of Siberia. The return cargo of Siberian produce was duly landed on our shores at the end of September 1919.

Considering the vast resources of Siberia in timber, minerals, hides and dairy produce, the development of this new trade route will be watched with interest.

CHAPTER XXXII

EUROPE NORTH OF THE GREAT MOUNTAIN AXIS (*cont.*)

We have now to finish our consideration of European trade outside the Mediterranean region. We have to deal with —

Northern Spain, most of France, and Central Europe (*i. e* from the Alps to Black Sea). Notice that we can group this large area into four agricultural regions and four manufacturing ones Thus we have :—

Agricultural and pastoral France Southern Germany Hungary and Moravia. Rumania and Bulgaria	Mainly agricultural and pastoral.
Scattered areas in France. Manufacturing regions of upland Austria, *i. e* Bohemia and Alpine provinces Switzerland. Northern Spain.	Manufacturing regions.

Let us consider France first. This country is a producer of foodstuffs, as we should expect when we consider the large percentage of lowlands it possesses. Cereals are widely distributed, but do not enter into foreign commerce on a large scale as France does not supply enough for her own requirements. As we have seen, beet is important, and in addition Brittany and Normandy are market-gardening regions Cherbourg, for instance, is a port of call for outward-bound Atlantic liners, which take in supplies of fresh vegetables there

As is well known, the vine is cultivated widely in

France, especially in Champagne, Burgundy and the basins of the Loire and Garonne. Cognac (brandy), Dijon, Maçon, Reims, etc., are the chief centres of industry, and Bordeaux, St. Nazaire and La Rochelle are the principal outlets.

Where the wine industry is important you will find that copper sulphate is either manufactured or imported, the reason being that it is needed for the spraying of the vines in order to keep them free from disease. Bordeaux, for instance, imports large quantities of sulphate and also manufactures some. We shall find the same import occurring in the trade of Italian and Spanish ports. Bordeaux is the outlet for South-western France. It exports wine to U.S.A., Germany, S. America and the U.K., and large quantities of pit props to the S. Wales ports. It imports coal from the U.K., phosphates from Tunis, petroleum from U S A. and Russia, cereals from U.S A. and the Argentine.

Another industry of great importance in France is that of silk. Mulberry trees are widely grown, and on the leaves of these the silkworms are fed. The centre of the industry is at Lyons. Note its position at the junction of the Rhone and Saône, and close to the St. Etienne coalfield. Its manufactured goods can be sent either via Marseilles or via Dijon and Paris. Other towns further down the Rhone valley, such as Avignon and Nimes, also specialize in silk, but Lyons sets the fashion for the silk world. Iron-foundries and manufactures of small arms and ordnance are situated at St. Etienne and Creuzot.

Marseilles is obviously the most important port, but as its trade is mainly Mediterranean in character we shall deal with it in the next chapter. There are important textile and other manufactures connected with towns near the Briey-Nancy iron ore district. For instance, Sedan, Epinal, Nancy, Belfort, etc., manufacture cotton and woollen goods. Troyes on

the upper Seine has long been noted for hosiery, just as Grenoble in the French Alps has long been famous for its gloves.

The communications of France naturally radiate in all directions from Paris, for the city is on a navigable river and at the junction of the Seine and Marne. Moreover, it is centrally placed in the plain of France. It is, in fact, the key of France, just as London is the key to our country. In the same manner it is a distributing centre, and has, too, important manufactures of its own, especially as regards the trade in luxuries and fancy goods

You should notice how the Auvergne plateau has comparatively few railways crossing it It is but poor pastoral country for the most part, cut up by limestone gorges and dotted with extinct volcanic peaks called "puys." Hence it is scantily populated and commercially unimportant. Its steep eastern escarpment, known as the Cevennes, overlooks the Rhone valley and is a considerable bar to communication between east and west

We have already mentioned Dijon. It is an important junction. You will see that the main line from Paris crosses the Côte-d'Or at this point and that it divides into two branches, one going south and the other eastwards These main lines in their turn throw off branch lines, so that we get the following routes :—

1 Via Lausanne and the Simplon tunnel to Milan.

2. To Belfort and the Rhine via the Doubs valley, Belfort and the "Burgundian Gate," as the gap between the Jura and Vosges is called.

3 To Mâcon and Mt. Cenis tunnel to Turin.

4 Lyons and the Rhone valley to Marseilles and the Riviera.

You should, as usual, make a note of the important gaps. For instance, that between the Pyrenees and

the Auvergne plateau. It is generally known as the Toulouse Gap and is followed by the Canal du Midi, joining Bordeaux with the Mediterranean port of Cette. Then there are the gaps at either end of the Pyrenees. The western one leads via Bayonne to the important iron ore district of North Spain, which we may consider for a moment.

Coal occurs near Oviedo in the province of Asturias. About 3 million tons is raised annually. Some of this is used by the blast furnaces at Bilbao and Santander, and some is exported to Barcelona. But of course it is not enough for home consumption, and Spain has to import much British coal.

On the other hand, iron ore is plentiful in N. Spain, and as it is of excellent quality is exported in large quantities. One-half of the total output goes to the iron-smelting ports of S. Wales. The Netherlands take the next largest share, but most of it is for German consumption and is sent from Rotterdam to the Westphalian coalfield. France and Belgium are also important customers. Bilbao and Santander are the principal ports of export, but much ore is also shipped from the smaller ports of Passajes and Castro Urdiales. The annual returns of output show that the best ores are gradually being worked out, and that recourse is being had to working inferior ores situated further from the ports.

We come, next, to another important manufacturing area—namely, Switzerland. Here is a small country with much ground incapable of commercial development, entirely shut off from the sea and without raw materials; yet one which carries on a considerable foreign trade. How is it enabled to do this? Because of (1) the skill and perseverance of its dense population; (2) natural resources in water power; (3) a natural asset in its scenery; (4) the manufactures are of high value and yet not bulky, so that they can be easily transported by rail.

The upland pastures have led to an important dairy industry and allied manufactures. The abundant water supply, which can be used for either water or electric power, enables manufactures to be carried on with imported raw materials such as iron.

We summarize these manufactures in the following Table —

Industry	Principal towns	Origin of raw material	Exports
Cotton	Zurich, Lucerne, St Gall	U S A via Havre and Antwerp	—
Silk	Zurich, Basle, Lucerne	Italy (Milan) via St Gothard Railway	Large exports of silks, ribbons and embroideries to U K
Watches and Clocks	Geneva, Neuchâtel, etc	Iron ore and coal from Germany	Exported to U K, Germany, Argentine
Machinery	Zurich, Berne		Machinery and weaving-looms to France, Italy
Milk Chocolate	Lucerne, Berne, etc	Raw cacao from U K and Netherlands	To U K and Italy
Condensed Milk		Milk, home-produced	To U K and India
Cheese			France, U S A, Germany
Colours (*i e* aniline dyes, etc)	Basle	U K, Germany and France	Exported to Germany, U K, U S A, Italy, Japan, British India, etc

In addition to these manufactures, the Swiss peasants spend their time in winter in manufacturing and carving by hand many wooden articles (such as cuckoo-clocks, toys, etc.), which are sold to tourists. The tourist traffic is, of course, very important, and during a year as many as a million foreigners may visit Switzerland.

Naturally this means so many more people to feed; so large supplies of foodstuffs have to be imported Much grain comes from the Argentine via either Marseilles or Rotterdam. You should measure

the distances of these ports from Switzerland and consider which would be the better route for the importation of grain, bearing in mind that one route is by rail and the other may be largely by water.

We have now to deal with the rest of Central Europe.

We will begin with Germany and work eastwards. The part of Germany we have not so far considered is mainly agricultural and concerned with the upper and middle Rhine. If we want a ready, though rough, way of remembering the economic regions of the Rhine Basin we may divide the area into four regions, as shown in the annexed diagram.

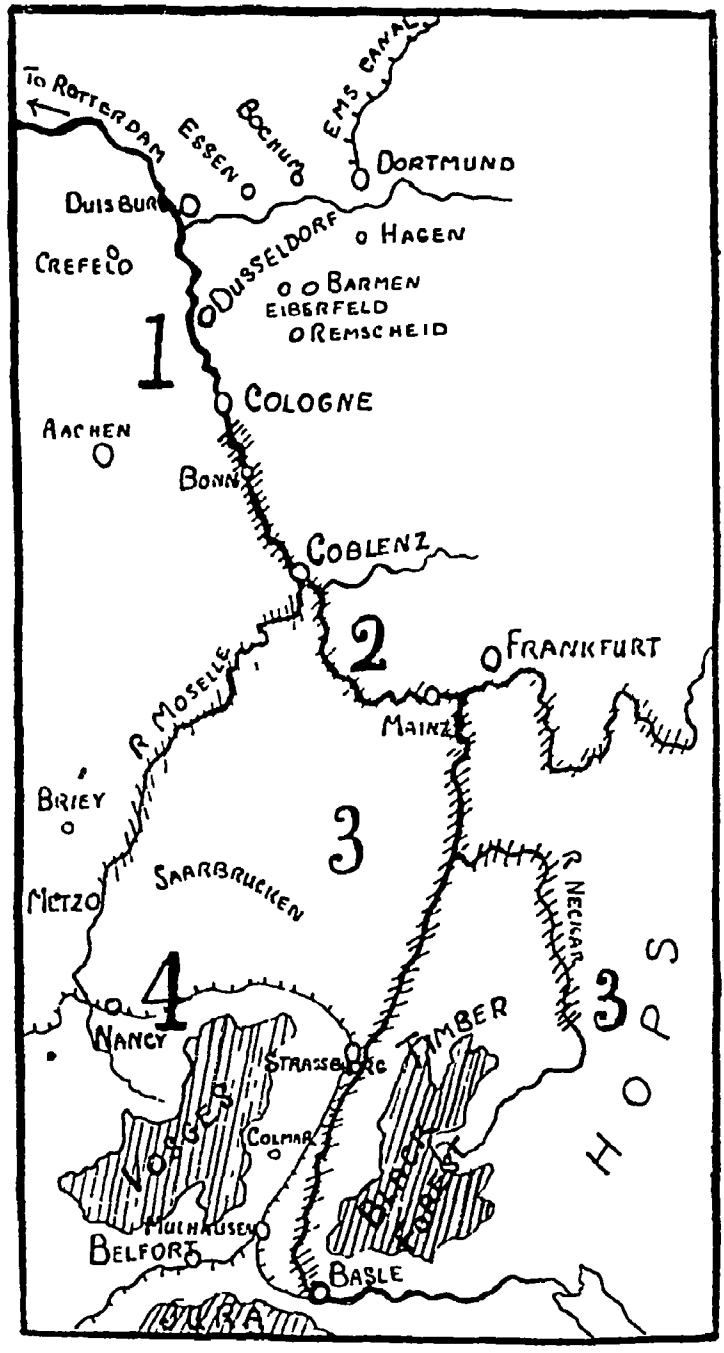
We are now considering areas 3 and 4 only. In the first named tobacco, the vine and cereals are grown. Hops are a large crop and have led to the brewing industry of Munich, a model town, the capital of Bavaria and a centre of art. The vine is cultivated in the middle Rhine and its tributaries. Timber comes from the Black Forest and is floated down the Neckar and Rhine to the Dutch frontier towns. Stuttgart is the centre of the book trade. Nuremberg specializes in wooden manufactures, especially toys Strassburg we have noted before. South of it lies a textile manufacturing area with Mulhausen and Colmar as centres. Further down the Rhine are such important confluence and bridgehead towns as Mannheim, Mainz, Coblenz and Cologne.

Proceeding eastwards we come to the Austro-Hungarian territories. There are two main divisions.—

A Uplands—mainly manufacturing and mining.

B. Lowlands—agricultural and pastoral.

ECONOMIC REGIONS OF THE RHINE BASIN



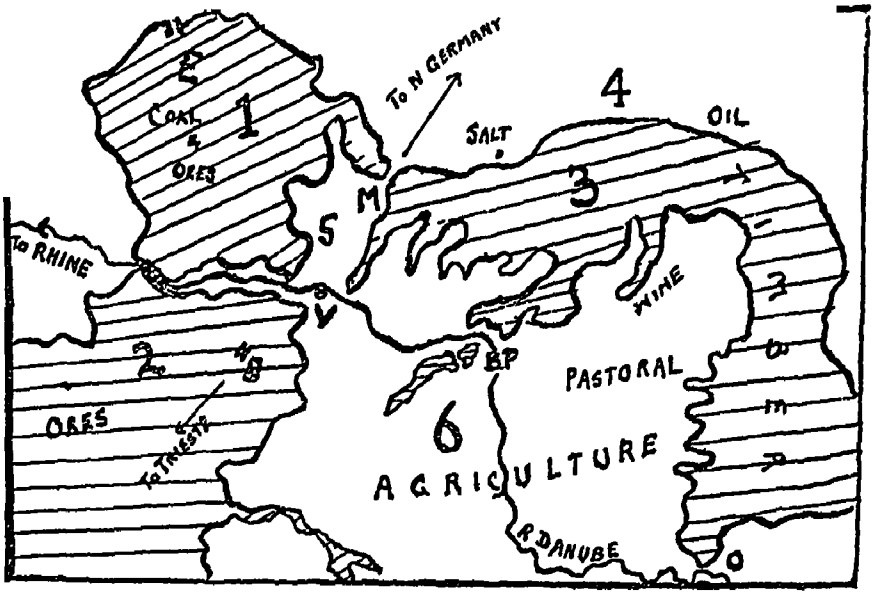
1 Manufacturing area of Westphalian coalfield
2 Mainz—Bonn mainly tourist centre
3 Agricultural regions
4 Manufacturing area of Lorraine and Alsace

//// = Vine growing = Canals

We may conveniently subdivide them as in the annexed diagram.

[N.B.—Since the Treaty of Peace (1920) the Austro-Hungarian Empire has ceased to exist, but the boundaries between Austrian and contiguous territories have not yet been determined.]

COMMERCIAL REGIONS OF AUSTRIA-HUNGARY



▨ = Uplands
V = Vienna
M = Moravian Gate
E = Elbe Gorge
S = Semmering Pass
BP = Buda-Pest.
O = Iron Gates

We have numbered the commercial areas thus .—

1. is Bohemia, with the coalfields and chief manufacturing towns of Bohemia, such as Prague, Pilsen, Eger, etc The last-named town is the centre of the glass industry in which Bohemia has attained a world-wide reputation.

In this area is also included a portion of Silesia, which is well placed for importing German ores and coal, and which, therefore, has textile and other industries at Troppau and elsewhere.

2. is the Alpine region, rich in iron and other ores.

Steyr, Graz, Eisenerz, etc., are centres of the iron industry; salt is mined extensively near Salzburg, Bleiburg has lead ores and Idria produces quicksilver.

3. is the Carpathian region, with various ores and much timber.

4 is the Galician foreland, with salt mines at Wieliczka and oilfields south of Lemberg.

5 is Moravia, in which beet is an important product.

6 is the great plain of Hungary, noted for wheat, maize, cattle, and, in the north round Tokay, for wine.

The cattle supply the raw material for the leather industry of Vienna and Budapest Both towns also make agricultural machinery and have sugar refineries.

The principal exports of Austria-Hungary to the United Kingdom are sugar, raw and refined, in large quantities, eggs, leather goods and glass

Much of the export trade of Austria is naturally with Germany and the Balkan States

Generally speaking, we may say that the exports will be sent by one or other of the routes, using the important gaps shown in the diagram.

Thus goods to Germany can go either north by the Moravian Gate or by the Elbe Gorge, or west by the Danube.

Trade with the Balkan countries will go down the Danube, and goods for Italy and the Mediterranean may go via the Semmering Pass and Trieste.

Suppose a merchant in Prague wants to export, we will say, sugar to the United Kingdom. It is obvious that he can send it via the Elbe to Hamburg, from which it will be shipped, or he can send it to Trieste and export it by an Austrian shipping company like "The Austrian Lloyd" line, which has its headquarters there.

The latter route is much the shorter but more difficult one of the two. As a matter of fact, most of

our sugar imports from Austria do for this reason come via Hamburg.

Again, a consignment of goods from Vienna, say, to Breslau could be sent by water, as there is a canal connecting the March, a tributary of the Danube, with the Oder. Goods can also be sent in barges and river steamers down the Danube and transferred to ocean-going vessels at Braila. To this port, too, will come large quantities of wheat and maize from Rumania, also noted for its oil, which comes from the Ployeshti region at the foot of the Carpathians and which is exported from Kustenfi.

Bulgaria exports, through Varna and Burgas, wheat and maize to Belgium, France, Greece and elsewhere; eggs go to Germany and Austria, and attar of roses to France, Germany and the United Kingdom.

The remaining Balkan States of Central Europe are commercially unimportant and call for no comment.

NOTE.—Trieste now belongs to Italy.

CHAPTER XXXIII

THE MEDITERRANEAN AND BLACK SEA

THE countries bordering the Mediterranean form, by reason of their climatic conditions and natural resources, one of the great natural regions of the world For this reason they afford an interesting area for economic study

We saw in Chapter II that a Mediterranean climate means winter rains and hot, dry summers, and that the characteristic vegetable products are, therefore, those which can adapt themselves to these conditions.

We have, then, as the normal vegetable products of this region.—

1. Mediterranean fruits, such as oranges, lemons, almonds, figs, olives, grapes and so on.
2 Mediterranean trees and plants, such as the mulberry, cork-oak, lavender, esparto grass, vine and tobacco.
3 Cereals—especially wheat and barley.

Now dry summers mean irrigation, and where this is practised on a large scale we may expect such crops as maize, rice and (in Egypt) cotton.

From the dry countries of North Africa phosphates will be an important product.

We have, too, to consider the region bordering the Black Sea, which, being a rain-shadow area, has greater extremes of climate than true Mediterranean countries, and which therefore will be of the prairie or grassland type, eminently suited for cereal growth

Let us say, then, that the area under discussion is

essentially an agricultural one. This is our first point.

Our second point will be that there is, generally speaking, an absence of coalfields. There is an important one in the Donetz basin in South Russia, and minor ones in Turkey, but in the Mediterranean proper coal is absent.

Here, then, we have a very important point. The great article of import to all the Mediterranean countries will be coal and coke.

As regards other mineral wealth, ores are none too plentiful and are widely scattered. The chief ore districts are:—

1 Spain, along the southern edge of the central plateau (Meseta), lead (at Linares), zinc, mercury (at Almaden), iron and, above all, copper in the Rio Tinto valley.

2. Iron and sometimes zinc deposits in Greece, Algeria, Tunis, South Russia and Elba.

3. Miscellaneous ores in Portugal, Greece and Asiatic Turkey.

4. Sulphur deposits in Italy and Sicily.

Manufacturers, as we might therefore expect, are poorly represented, with the exception of the textile factories of Catalonia (E Spain) and those of Italy (Piedmont and Milan), and the production of wine and olive oil. We may expect, then, as general items of import into the Mediterranean: Textiles, iron and steel products, especially agricultural machinery.

Lastly, we must remember the salt fish trade (see Chapter XXXII)

Let us take Great Britain's trade with the Mediterranean and Black Sea as typical of the general exchange of products.

We do not want manufactured goods · they (Mediterranean countries) do not require our foodstuffs. On the other hand, we require oranges, currants

and raisins, etc., any amount of grain and petroleum from the Black Sea region, eggs from Italy and Egypt, mohair from Asiatic Turkey. Copper and other ores are required by the S. Wales smelting-towns, and there will be a demand over here for miscellaneous products such as corks, wine, esparto, sponges and olive oil.

Thus the chief items of import from the Mediterranean into the United Kingdom are, in tabular form :—

Import	Country of chief supply	Approximate average value in £
Cotton	Egypt	20,000,000
Foodstuffs	Rumania and Russia	Very variable
Onions	S E Spain and Egypt	1,200,000
Eggs	Italy, Egypt	1,000,000
Copper	Spain	600,000
Cork	Spain, Portugal and Algeria	900,000

In return we can supply all Mediterranean requirements .—

Salt fish, cotton yarns, woollens and worsteds, machinery, ships (chiefly to Spain), and, above all, coal and coke Our exports of these last two articles are very large—some £20,000,000 worth annually. Italy, Spain and Egypt take the bulk of our supplies, and these three countries in 1913 accounted for £11,700,000 worth of coal, coke and manufactured fuel From all this you ought to have a clear idea of the general run of trade in the Mediterranean.

Coming to a more detailed examination of the subject, we shall confine our attention mainly to Italy, Egypt and the Iberian Peninsula, as these are the most important countries from a commercial point of view.

Naturally, the Plain of Lombardy is the most productive part of Italy. It is a fertile alluvial plain,

well watered and therefore capable of being irrigated, sheltered from the cold north winds, and open to the mild climatic influences of the Mediterranean.

It is, in fact, at once the chief agricultural and manufacturing area of Italy.

Crops of wheat, barley and other cereals, hay and vegetables are produced. The meadows support large numbers of cattle, which have led to a trade in exported hides and a considerable dairy industry, especially in cheese.

Rice is grown on irrigated lands (round Novara, for example), often in rotation with other crops. There are 173,000 acres under cultivation in Piedmont alone, the average yield being 200,000 tons, which is largely exported to South America. Rice husk is ground for cattle food and exported to France and Germany.

Piedmont is also important for the cultivation of the vine. Alessandria, Asti and Montferrato are the principal centres of production. Turin is the wine market. Beet sugar is produced in Venetia and Emilia; hemp in Emilia, Campania and Southern Italy. Vegetables are exported either dried or canned, and there is a considerable export of potatoes to British India and Egypt.

Wheat is most important round Milan, and the harder kinds of wheat used in making macaroni come from Southern Italy. The wheat crop has, however, to be supplemented from foreign resources. Naples imports, for instance, hard grain from Russia and India, softer kinds of wheat from Rumania and Australia.

Of typical Mediterranean fruits which enter into Italian commerce we may notice lemons, mainly from Sicily, and olives from Sicily and Southern Italy.

Another Mediterranean plant, lavender, is exported from Italy to the French perfume factories in the Riviera.

Italy has long been noted for its silk industry:

Piedmont and Milan are the chief centres of production. In the former region the average yield of cocoons is worth nearly £900,000, and Cuneo is said to be the largest cocoon market in the world. There is also a considerable import of this article from Turkey.

The chief silk manufacturing towns are Milan, Como, Bergamo, Brescia and Cremona.

The finished silk goods are exported to Turkey, British India and South America. They cannot, however, compare in quality with the best French and German manufactures which are still imported into Italy from Lyons and Crefeld. Raw silk is exported to Switzerland, the United Kingdom and elsewhere (see Chapter XXXIII).

Wool and cotton goods are manufactured at Alexandria.

The cult of the mulberry tree and vine necessitates large imports of copper sulphate, which comes almost entirely from the British Isles

The iron ore of Elba has already been noted. On the mainland opposite in Piombino there are important iron-smelting and tin-plating works, the products of which are all consumed in Italy These factories import much coal, mainly from the United Kingdom, especially Scotland If more iron is required it is imported from Austria

Among minor exports we may note trade in hay, timber, etc, with Tripoli, marble from the famous quarries at Carrara, coral, olive oil, motor-cars and tyres.

Next to coal as an import rank cereals, 66 per cent. of which come from Rumania Some of this is exported as flour to Turkey and the Levant.

Phosphates and chemicals come from Germany, raw cotton is easily imported from Egypt and India, and less easily from the U.S.A. Much of this is re-exported to Turkey.

Italy's chief ports are Genoa, Venice, Naples, Leghorn and Ancona. All these import much coal and coke from Great Britain.

The Italian mercantile marine is considerable, and the rest of the trade is carried on by Austrian, British, German and Greek ships, the latter of which are rapidly increasing in importance.

The communications of Italy form the subject of a question at the end of the chapter.

Turning to Egypt, we find again products typical of an alluvial and irrigated area: crops of rice, cotton, cereals, vegetables and some tobacco. As manufactures from these we have cigarettes, cotton-seed cake and oil figuring on the export list. The imports are also typical Coal for bunkering purposes at Alexandria and Port Said, textiles, machinery of all kinds and timber. all of which, it is obvious, Egypt cannot supply for herself. The following shows the export trade from Alexandria :—

Article	Country to which sent	Value in £, 1913
Raw cotton	U K, Germany, Italy, Russia, Austria, and Switzerland	20,000,000 (average)
Cotton seed	U K and Germany	2,000,000
„ „ cake	U K	—
„ „ oil	Turkey	—
Rice	Turkey (£91,352)	137,000
Eggs	U K	—
Onions	U K. and Austria	U K 210,000
Cigarettes	France, Central Europe and Scandinavia	—

The Black Sea trade is concerned mainly with grain and petroleum as exports, and machinery as the chief import.

We may find a large tonnage of ships entering the Black Sea ports in ballast, because they either have

little imports to bring or they have discharged cargoes of coal at the Mediterranean ports. The return cargoes of grain, etc, are very heavy. Great Britain herself takes about one-sixth of them, but does much carrying trade for the countries of Northern Europe, especially for Germany

Odessa, Nicolaieff, Rostov, etc., all export barley, maize and wheat.

Italy takes most of the wheat, Germany most of the barley.

If the Russian farmers were more progressive, the trade better organized, and a proper system of grain elevators installed at the principal ports, the Black Sea grain trade could be much increased.

As regards minerals:—Iron ore comes mainly from Southern Russia (Krivoy-Rog Basin, near Kherson), but other fields near the Straits of Kertch are increasing in importance Petroleum (see Chapter VI) is mainly from Baku and Groznic, but is decreasing in quantity In 1900 Russia supplied 50 per cent. of the world's output of mineral oil: in 1911 she produced only 20 per cent. The oil industry necessitates importing drilling machinery, just as the grain trade requires imports of threshing machinery, ploughs and self-binders. The United Kingdom takes a large share of this trade.

Let us now complete our survey of the Mediterranean by considering the western area.

We have first the Rhone valley, with the largest of the Mediterranean ports—Marseilles—the total shipping of which in 1913 exceeded 20 million tons.

This town is obviously a nodal point. From it routes lead to :—

(*a*) The Rhine via the Rhone and Doubs valleys and Burgundian Gate.
(*b*) The plains of France and Belgium via Dijon
(*c*) Switzerland via the passes through the Alps.

(*d*) East to the Riviera or west to Bordeaux and Spain via the coastal plains.

The Rhone, as a waterway, has of recent years been much improved, so that it is now possible for boats to reach Château-du-Parc, ninety miles above Lyons.

The navigable portion of the river may be said to fall into three sections as follows :—

(1) Château-du-Parc—Lyons, 90 miles.
(2) Lyons—Arles, 172 miles.
(3) Arles—the sea, 30 miles.

In 1912 the traffic on boats and barges amounted in each of the above sections respectively to 198,000, 703,000 and 295,000 tons.

The goods carried were mainly coal, coke, timber, manures and agricultural produce

It will be seen from this that the river-borne traffic is considerable. But it is not nearly enough to relieve the congestion of traffic on the Marseilles–Paris line, which carries more heavy goods traffic than any other railway in France

For this reason a canal running north from Marseilles parallel with the course of the Rhone is now being constructed.

The Saône, too, is navigable for 200 miles, and a recently constructed canal connects the river with the Marne, and thus brings Marseilles in touch with Dunkirk

We mentioned elsewhere that the trade of Marseilles is mainly in goods in course of transit to Switzerland, etc., and in the industries connected with the importation of oil-seeds. In this latter respect it resembles our port of Hull It has large oil-seed crushing mills and factories for the production of tallow, glycerine and soap.

Coal and coke are needed for the factories and for

bunkering purposes, since liners from the East call at Marseilles, and it is also the headquarters of the important Messageries Maritimes Shipping Company. Wool for local consumption or for transit comes in large quantities from Algeria, Spain, Russia, Australia and Asiatic Turkey. Wheat is imported from the Argentine and India.

The chief exports are wines, spirits and soap.

The trade is mainly with the East and the Mediterranean countries, especially the French colonies in N. Africa.

We are concerned, secondly, in the Western Mediterranean area with the trade of the Iberian Peninsula, *i. e.* Portugal and Spain.

There is not much to detain us here, as we have in many places already noted the chief characteristics of the commerce of this area. Summarized briefly, it is as follows —

Exports · cork, fruits, especially oranges from Seville, and the irrigated gardens ("huertas") of S E. Spain, wine all these come from both countries.

Salt is exported from Setubal (near Lisbon) and Cadiz The ores of Spain have already been noticed Esparto from Eastern Spain, textiles from Barcelona go mainly to the Spanish South American States. Pit props and wolfram ore, both from Portugal, go to S. Wales.

Most of the Iberian ports import fish from Great Britain and Scandinavia, and coal and coke largely from S. Welsh ports.

There is trade with the Azores, Cape Verde Islands and Canary Islands, but this, of course, comes directly within the sphere of the N. Atlantic trade, and does not concern us here.

Lisbon is the most important port, for it is well placed as a calling-point for ships using the Mediterranean and S Atlantic routes.

It is visited regularly by the P. & O. boats plying

between London and Australia via the Cape, and by the R M S P., Ellerman, and Lamport & Holt lines sailing from British ports to Africa.

Finally, we must not forget the important bunkering trade of that vital strategical position, Gibraltar, which in this particular may be compared with the port of Valetta (Malta) in the Eastern Mediterranean.

We can summarize, then, the chief features of the Mediterranean and Black Sea region as follows :—

1. A large import of coal, particularly from the United Kingdom, into all Mediterranean countries.

2 A stream of shipping—much in ballast—for the Suez route to India, Australia and the Far East. Mails, passengers and cargo.

3. A return tonnage to Western Europe composed of—(*a*) Heavy cargoes of raw materials, especially foodstuffs, from India, the Far East and Australia. (*b*) A small overflow from East Africa.

4 Imports from U S.A. greatly in excess of exports to that country.

5. Large exports of grain and petroleum from the Black Sea.

6. Considerable cross traffic between France and her North African Colonies; Italy and her African Colonies

QUESTIONS ON CHAPTERS XXXII—XXXIV

72 Railways, wherever possible, follow the lines of least resistance Illustrate the truth of this from a study of the railway routes of (*a*) Italy; (*b*) Spain

73 Portugal has only 2000 miles of railway How can you account for this?

74 What important lines of steamships have their headquarters at Marseilles and Trieste respectively? What routes do they serve?

75. Make a diagram showing the import routes into Switzerland mentioned in Chapter XXXII. Add a

table showing the imports, the principal places and distance along each route

76 Treat the export routes of Austria-Hungary in the same way as in question 75

77 What geographical factors make the following important —Gibraltar, Valetta, Porto Ferraio (Elba), Constantinople?

78 With the aid of climatic and physical maps describe what you think will be the natural resources of Asiatic Turkey and the Levant.

79 By what alternative routes could a consignment of grain be sent from Buda-Pest to Venice?

Which route do you consider the better one? Give reasons for your answer

80 For what reasons are there no large ports, south of Fiume, on the east coast of the Adriatic?

81 Hamburg exports large quantities of sugar, raw and refined, to the United Kingdom Whence does she draw her supplies of—

(1) Coal for the factories,
(2) Raw sugar?

What other country exports sugar via Hamburg?

82 There is a considerable tonnage of British ships in ballast entering Russian Baltic and Finnish ports How do you account for this? With what cargoes will they clear?

83 What natural and artificial advantages have made Berlin and Paris the capitals of their respective countries?

84 Compare (*a*) Holland and Belgium, (*b*) Norway and Sweden as regards natural resources and industrial activity

B —THE ATLANTIC ROUTES

CHAPTER XXXIV

NORTH AND SOUTH AMERICA IN GENERAL

In the next four chapters we shall be dealing with three great continents—North America, South America and Africa. It will be as well first to get some idea of similarities and contrasts between them: we shall then be able to understand more clearly the factors which influence their economic development. Note first the positions of each.

(*a*) Most of Africa is inter-tropical; so is the northern half of South America.

(*b*) The Equator cuts the Amazon mouth and the extreme north of Victoria Nyanza.

(*c*) The 100° W. longitude line passes through the centre of North America. The 60° W. longitude divides South America in half.

(*d*) North Africa, extreme South of Africa, California and Central Chile lie in Mediterranean latitudes.

As regards size, you should notice that Canada and the U.S.A. are over 3 million square miles in extent, and together are about the same area as South America. Africa, the second largest continent in the world, is 11 million square miles.

Note, too, the very low density of population of all three continents. Thus:—

The U.S.A. have a population of about 30 to the square mile. Canada has a population of about 2 to the square mile. Argentine 6 to the square mile. Brazil 8, and the Union of South Africa 15 (Europeans 21·37 per cent.).

Such facts suggest that we may find labour-supply a serious problem in many parts of these countries.

Other points worth noting are :—

1. The great extent of undeveloped lands, such as the tundra regions, the Sahara, the great tropical forests, barren mountain plateaux, etc.

2. Great grasslands in North and South America and, in a lesser degree, in South Africa Thus we have the prairies of Canada and U S A., the llanos of Venezuela, the campos of Brazil, the pampas of the Argentine and the veldt of South Africa.

3. The Amazon Basin and forests correspond to the Niger and Congo forests.

4. The U.S A. has enormous resources in iron ore and coal Canada is also rich in these minerals, but at present South America's and Africa's resources in this respect are comparatively undeveloped.

The first two countries will, then, be mainly manufacturing, the last two continents mainly pastoral and agricultural.

It is clear, then, that generally speaking there will be a small interchange of commerce between Africa and South America, because over a large area their products are very similar For instance, the Argentine will not want South African wool any more than Nigeria will require Amazonian rubber

On the other hand, the tropical products will obviously find a market in North America, which can exchange her manufactured goods for them.

The same remark applies to Europe (*i. e.* Western Europe), which will also carries on a large trade with North America across the Atlantic

The U S.A. and Canada, being contiguous, will naturally exchange goods.

Such is in general an outline of the broad features of commerce on the Atlantic routes.

In reality the movements are more complicated.

As we shall see later, there will be an overflow of traffic from other routes to be considered before we have drawn a complete picture of Atlantic trade.

Coming to details, let us take South America first, and concentrate our attention on Brazil and the Argentine.

In Chapter XXX and elsewhere we indicated the principal resources of Latin-America, and found that Brazil exports mainly tropical produce; Argentine mainly foodstuffs and live stock. Imports to both are all kinds of manufactured goods, specially textiles and machinery, and coal.

Argentine has the larger trade, though her area is only one-third of Brazil's. The student should reason out why this should be so.

In order of value Brazil's exports are coffee, rubber, sugar, hides and leather, etc. It is estimated that four-fifths of the world's supply of coffee comes from Brazil. São Paulo, Rio, Espirito Santo, Minas Geraes are the principal coffee-producing regions, and of these the first named produces more than half the world's supply.

You should remember the conditions under which coffee is grown (see Chapter II). The coffee beans, after being picked, washed, etc., and spread out on terraces to dry, are ultimately transported to Santos, whence they are shipped mainly to New Orleans, New York and London.

Rubber, though in many ways an unsatisfactory material, is still an indispensable article of commerce, and seems to increase in importance. Undoubtedly the finest rubber in the world is native to Brazil, and flourishes throughout the Amazon Basin. Its name is taken from the port of shipment—Para

In the Amazon district the wild rubber juice is collected by "tapping" the bark of the trees, and is then put over a fire and smoked. From time to time the natives collect a paddle-full of the viscous mass and hold it in the smoke, which causes it to coagulate.

This is done repeatedly until a large ball of rubber collects on the paddle, when the ball is split by a knife, detached from the paddle and sterilized. These balls are then shipped down the Amazon in native canoes to Manaos or Para. The native rubber industry is, however, meeting with increasing competition from the plantation rubber of Ceylon and the Far East.

In the plantation industry the latex is taken to the factory, strained and mixed with acetic acid, which causes a clot to form, which is then washed, rolled and dried, and so prepared for export.

The cacao of Brazil is the second largest crop in the world, and is exported mainly from Bahia, which also produces tobacco

Live stock is increasing in importance, and there are millions of head of cattle and sheep on the plains of Southern Brazil. 1914 was the first year in which Brazil entered the frozen meat trade. Four years later she exported 60,000 tons of chilled meat. The three Southern States of Paraguay, Uruguay and Argentine owe their prosperity largely to the live-stock trade. Some of the largest sheep flocks in the world are reared on the plains round Buenos Ayres, and the heads of cattle at Fray Bentos, for instance, are numbered in tens of thousands Large freezing establishments and packing houses have been established at Rio, Montevideo and Buenos Ayres

Cotton, manganese ore and timber have a promising future as far as Brazil is concerned. Linseed and quebracho are already staple exports of the Argentine, and it is known that the climate and soil will suit hemp, cotton and other vegetable fibres.

The cereals of the Argentine need not be further discussed (see Chapters III and XXVIII)

There is now, as might be expected, an interchange of goods between these two neighbouring states. The Argentine gets her tropical fruits (*e. g* bananas, nuts) from Brazil, and in return sends wheat to the Rio flour mills.

O

All the South American States import large quantities of coal, for as yet coalfields are rare in the country. It is interesting, therefore, to hear that coal deposits of considerable value have been found recently in the Western Argentine. Up to the present this state has had to import all its coal.

In this trade the U.K. used to hold a commanding lead, but since 1914 we have been unable to send out our usual supplies, and South America has generally had to look elsewhere for its imports. Fresh markets, therefore, have been found in the U.S.A. and South Africa. This question of the trade between South America and the U.S.A. is an important one It is unusual to find the balance of trade against the U S A. But the fact remains that before 1914 her excess of imports over exports to South America was about £20,000,000, as contrasted, for example, with a European balance in the right direction of £125,000,000.

A great deal of British capital has been invested in Latin America, who owes not a little of her present prosperity to British brains and enterprise, and it is therefore disturbing to find how seriously the war has undermined our position.

The U.S.A. have increased vastly their hold on South American trade; Japan has got a footing, and there is much more mutual trade between the various South American States, all of which means loss to the British exporters. The following figures show the leeway we have to make up and how the U.S A. has, thanks to the war, been able to double her export trade to Brazil and more than quadruple it to the Argentine:—

EXPORTS FROM (VALUE IN POUNDS)

To—	U K.	U S A.
Brazil, 1913	13,000,000	8,500,000
1917	7,900,000	21,000,000
Argentine, 1913	23,400,000	6,600,000
1917	16,600,000	27,600,000

The Argentine communications are very well developed, and there is a network of railways serving the agricultural and pastoral regions. (See Chapter XII.) For obvious reasons, Brazil is very backward in this respect.

Both states are developing their mercantile marine, which is largely employed on the coastal traffic mentioned above.

The principal lines (other than those already detailed in Chapter XX) serving the South American ports are.—

Booth Line · Liverpool—Para and Manaos

Italian Lloyd. Genoa—Rio and Buenos Ayres.

Messageries Maritimes · Bordeaux—Rio, Santos Montevideo, Buenos Ayres.

Compania Transatlantica: Cadiz—Buenos Ayres.

CHAPTER XXXV

BRITISH POSSESSIONS IN THE NORTH ATLANTIC

Our Empire possessions in the North Atlantic include the Bermuda Islands, the West Indies, British Honduras, British Guiana and the Dominions of Canada and Newfoundland.

For the trade and products of our possessions in the West Indies and Latin America we refer the reader to Chapters III and XXX. There are, however, one or two remaining points to be noticed.

1. The trade of the U.K. with these countries has been seriously affected by the war, which has enabled the U S.A to invade many of our markets there. If we look up the trade reports and statistics of the countries under consideration, we shall find that, although our import trade with them in almost every case is greater than that of the U.S.A., we are very much behind the Americans in the value of exports that are sent to our possessions in the North Atlantic. For instance, Jamaica now imports from the U.S.A. over 2 million pounds' worth of goods annually—*i. e.* double our exports to Jamaica The same kind of thing is true of the rest of our possessions in the Caribbean Sea. We shall see presently how this affects shipping in the North Atlantic.

2. Canada, on the other hand, is increasing her trade with the West Indies.

3. The country which has made most progress lately is Trinidad. To her exports of asphalt, cacao and sugar she now adds petroleum. In 1917, 56 million gallons of oil were obtained, and the exports of

a large portion of this quantity were valued at £349,200. There are now eleven oil companies operating in Trinidad and many local refineries. With the growing importance of oil it is clear that the Empire has a valuable asset in this small island

Turning to our possessions in the temperate zone we find that Newfoundland, our oldest colony, is a small but enterprising country and has a steadily increasing trade. Fisheries are most important and there is a large export of dried cod, herrings, seal and cod oil. There is a cold storage at St. John's and a prospect of considerable development of the frozen fish trade.

Iron ore from Belle Island in Conception Bay is another export; the annual production now being nearly a million tons Copper ore and iron pyrites are also exported Much of Newfoundland is forest, and pulp and paper mills have been erected at such places as Grand Falls and Bishop's Falls. The U K is Newfoundland's principal customer. Imports naturally come from Canada and the U S A.

We now come to Canada—a country nearly as large as Europe, and thirty times the size of the British Isles. From Cornwall (Land's End) to John o' Groat's is 600 miles · we could travel this distance in a day. We should require five days to do the journey from Montreal to Vancouver Yet the population of this vast expanse is but a million more than the population of London. The fact is that Canada has millions of acres of unexploited land, and though we do not say that all these could be profitably developed, we do claim that Canada is a country of enormous commercial possibilities.

Before studying the commerce in detail, let us get some idea of the climate and vegetation belts of the country.

We ought, of course, to speak of the "climates"

2. Agricultural in the main the great wheat areas of Manitoba, Saskatchewan and Eastern Alberta.

3 Same as 1.

4. Fur and fish; mineral resources mostly undeveloped.

We might work out the economic details by considering each of these regions in turn, but as the provinces contain a variety and a similarity of resources such a treatment would tend to muddle us We think it will make for clearness if we consider the commerce of Canada under the following headings Fisheries, forests, agriculture and pastoral industry, minerals, manufactures.

Fisheries.—It is calculated that there are 5000 miles of coast line in the east and 7000 miles in the west of Canada In addition, there are 200,000 square miles of fresh water. Thus there is plenty of scope for a fishing industry, and British Columbia and Nova Scotia naturally have the most important fishing grounds.

The deep-sea fisheries supply especially cod and halibut and, off the west coast, whales The inshore fishing grounds produce lobsters in large quantities, oysters (especially in Richmond Bay), herring and mackerel. The Fraser and Skeena Rivers swarm with salmon.

In 1907 the total value of fish and their products was well over 10 million pounds. An enormous quantity of dried cod (77 million lbs), canned salmon, canned and fresh lobsters was exported to the United Kingdom and elsewhere.

Forests—These are estimated to cover between five and six hundred million acres. Before 1914 British Columbia had the most extensive forests, but in June and July, 1919, disastrous forest fires occurred and destroyed 95,000 square miles of timber. Thus, at the present time, British Columbia's resources

are considerably less than those of Quebec and Ontario. All the other states also contain good supplies of lumber, which is cut in the winter or "fall" and is floated down the rivers in the spring to the saw- and pulp-mills. Such lumber rivers are the Saskatchewan, Saguenay, St. John and Ottawa.

The wood-pulp industry of Canada has grown rapidly the last few years, consequent on the U.S.A.'s heavy demand for pulp. The pulp is produced by either mechanical or chemical means. All woods are by no means suitable for these processes. The best woods for pulp making are the spruce, balsam fir and grey pine, all of which flourish particularly well in the Eastern Provinces. In 1914 the pulp mills' output was an increase of 82 per cent. on the 1910 production. In the year 1917–1918 the surplus of pulp exported was valued at over 5 million pounds. Quebec leads in production, over half the Dominion's supply coming from this province. The total annual value of forest products runs into millions, and the wood industry employs 57,000 people.

Agricultural, pastoral and fruit farming.—The Central Plains specialize in cereals, especially wheat. The Eastern Provinces engage in mixed farming. Ontario produces Mediterranean fruits, British Columbia and Nova Scotia the more temperate kinds; the apples of the last-named state being in great demand. Dairy produce, especially in the Eastern Provinces, is increasing rapidly in importance, and the U.K. imports large consignments of Canadian butter, eggs, bacon, hams and cheese. The following round figures give some idea of the yield and steady growth of production of the three main cereals.—

	1913 Millions of bushels	1918 Millions of bushels
Wheat	166	210
Oats	350	456
Barley	55	83

Observe that oats is the biggest crop, though wheat, of course, is first in value. Much of the produce comes to Great Britain. With the elimination of Russia from the world's food markets, the Canadian crops should find valuable new markets in Europe. In this connection it is noteworthy that in June 1919 the Greek Government placed an order with Canada to supply Greece with wheat for a year at the rate of a million bushels a month

Minerals—Canada is rich in mineral wealth and there are large resources as yet undeveloped This particularly applies in the case of iron ore, and in a lesser degree to coal At present the most important coal mines are at Nanaimo in Vancouver Island, and Sidney in Nova Scotia; large deposits in Western Alberta and the Kootenay and Banff districts are practically untouched. In the Rockies, at places like Kootenay, Cassiar, Omenica and Cariboo, and in the basin of the Yukon at Dawson city, gold is found in considerable quantities. Lately large silver deposits have been exploited at Cobalt (Ontario), and Sudbury in the same province has long been noted for its nickel and now produces two-thirds of the world's supply. The same province also produces petroleum Quebec has graphite, zinc, lead, mica, chrome, iron and asbestos deposits. This last-named mineral is produced in the eastern townships for instance, at Asbestos, near Danville, on the Grand Trunk Railway. It is quarried, crushed and rolled, and its fibres are drawn out by machinery. Owing to its fire-resisting properties it is put to many uses and is in great demand for fire-proof curtains and scenery at theatres; firemen's clothing; roofing slates and all kinds of constructional and engineering work Gold is declining somewhat in output, but coal, nickel, copper, iron ore and zinc are all on the increase. Ontario is first in value of mineral production, British Columbia and Quebec rank second and third respectively.

As the population of Canada increases the mineral output will develop in proportion.

Manufactures.—The growth of Canada as an industrial nation has been remarkable since 1914. Before, we were apt to look upon Canada as an agricultural country pure and simple. Though she did manufacture 70 million dollars' worth of goods, we lost sight of this fact because of the much greater wealth of her raw products.

Now her manufactures are worth 678 million dollars. Even allowing for the abnormal conditions of the money market due to war conditions, there is clearly an astonishing increase in her industrial wealth. Naturally, the growth has been most marked in the case of her iron and steel industry, and much of the output has been in the form of munitions of war. The remarkable thing is that, with such a small population and with many thousands of her best men serving overseas. Canada should have been able to maintain such an output of manufactured material. It clearly shows what resources she has. In 1910 the exports of iron manufactures were valued at a little over 2 million dollars. In 1918 they were worth 38 million dollars: *i. e.* nearly twenty times as much. The imports of iron ore were 158½ million tons, all of which came from the U.S.A., and coal and coke imports reached 81 million tons. If the factories could turn out munitions on this scale they should be able to compete successfully in the world's markets in the period of reconstruction after the war.

The chief manufactures now are the canning and preserving of fish and other food products, textiles, wood pulp and paper, all kinds of iron and steel goods, especially motor-cars and agricultural implements, chemicals and leather goods.

The imports, other than those already mentioned, are chiefly textiles from the U.K., sugar from the West Indies, tea, jute and hemp from British India,

petroleum and tobacco from the U S A , and some textiles and miscellaneous goods from Japan

The one unfavourable feature from an Empire point of view is the decrease in the exports from the U.K to Canada. The U S A always has an advantage over us in geographical position, and it has been still more favoured by the war conditions, but we ought to do better than allow the present conditions of things, in which the U S A.'s share of the Canadian import trade is 80 per cent , while ours is but 8 per cent. The great bulk of the overseas trade of Canada is carried on through the Eastern ports. According to the *Statesman's Year Book* (1919), the import and export trade of Vancouver for 1917 was (in round figures) valued at 69 million dollars, whereas the trade of Montreal alone was valued at 722½ million dollars. All the Canadian ports have good harbours, though the St. Lawrence and Great Lake ports are frozen over in the winter months The order of importance of the leading ports is —

Montreal, St. John, Toronto, Halifax, Vancouver, Quebec, Ottawa A good deal of traffic goes by canals, which in 1917 carried vessels amounting to 20 million tonnage.

Railways now total 38,000 miles in extent. For the C.P.R. system see Chapter XII. Other systems are —

1. The Grand Trunk in the Eastern Provinces
2. The Great Northern in the Central States.
3. The Inter-colonial, linking Montreal with the winter ports of Halifax, Sydney and St. John
4. The recently completed Grand Trunk Pacific Railway, which has a length of 3600 miles and traverses Canada from east to west Its terminus on the East is Moncton in New Brunswick, whence it runs via Quebec, Winnipeg, Saskatoon, Edmonton to the Rockies, which it crosses by the Yellow Head Pass. It then follows the Upper Fraser Cañon and the

Skeena River valley, which leads to the Pacific terminus at Prince Rupert. The railway will open up the more northerly portions of Alberta and the Rockies which were not within reach of the C.P.R.

Other interesting transport schemes are the Winnipeg–Hudson Bay Railway (now in course of construction) and the Georgian Bay Canal (see Question 69, Chapter XXVIII).

We are now in a position to summarize the movements of trade from and to the British possessions in the North Atlantic.

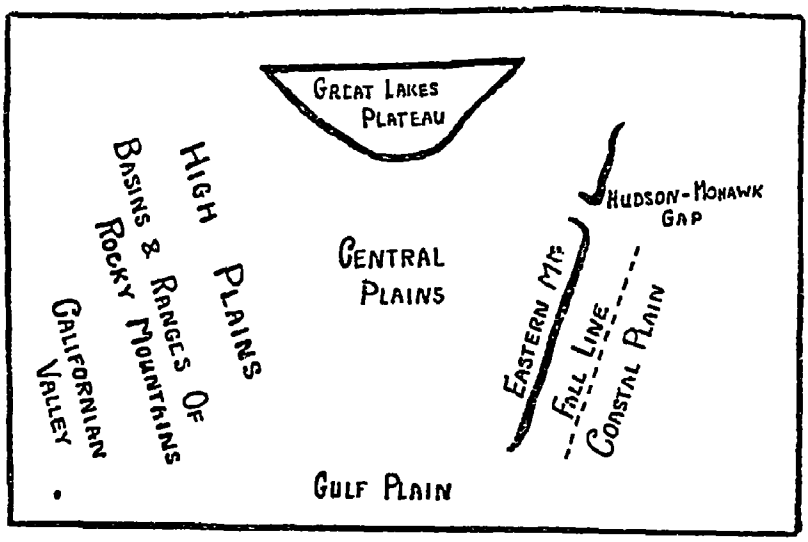
1. In general terms, then, we have: cargoes of raw materials, especially temperate and tropical foodstuffs, moving east to the U.K. and Europe. A return stream of vessels either in ballast or with coal and miscellaneous manufactures, mostly of machinery and textiles.

2. The West Indian and Central American trade across the Atlantic eastwards is comparatively small, with the U.S.A. large. The direct voyage from here to the West Indies and back can hardly pay, the cargoes either way are not large enough to warrant it. So, much of the work done by British ships is no doubt indirect, and, before 1914, a good deal must have been carrying trade between the U.S.A. and the West Indies. A cargo steamer might, you see, make a kind of circular tour: sail from here to Canada or U.S.A. with cargo or in ballast, pick up there a cargo for the West Indies and, perhaps, some South American ports, and return from the Argentine with a full load of grain.

CHAPTER XXXVI

THE U S A.

THE United States of America are slightly larger than Canada in area, but contain nearly twelve times as many people, and natural resources greater than those of any other country in the world. The American nation leads the world in the production of the principal cereals, coal, iron ore petroleum and raw cotton, all of them staple commodities. A glance



at the annual statistical publication of the U S A. Government shows the magnitude of the country's commerce, which in this and the following chapter we shall attempt to study. The reader must realize, however, that in such a small space the survey must necessarily be very inadequate. In physical features and climate, due allowance being made for latitude, the U.S A. are somewhat similar to Canada, so that we have very much the same arrangement of economic

zones and the same productions. Where the States score over Canada is in the fact that they stretch southwards, so that there is no waste ground of the tundra type, and sub-tropical products such as cotton, sugar and tobacco can be grown on a large scale.

In simple diagram form we can represent the physical features of the U.S.A. as shown on the previous page.

We draw particular attention to (1) the Hudson–Mohawk Gap, which is the one great through route across the eastern mountains and which has been a dominating factor in the development of the U.S.A. (2) The fall line which represents the junction of the hard rocks of the piedmont plateau with the softer strata of the coastal plain, and along which, therefore, there is a line of waterfalls the water power of which has helped to determine the sites of towns.

If we study a physical map it will not be very difficult to see which towns lie on this line and which rivers cut important valleys deep into the mountain ridges. We can indicate the "fall" line towns by a simple diagram as shown opposite.

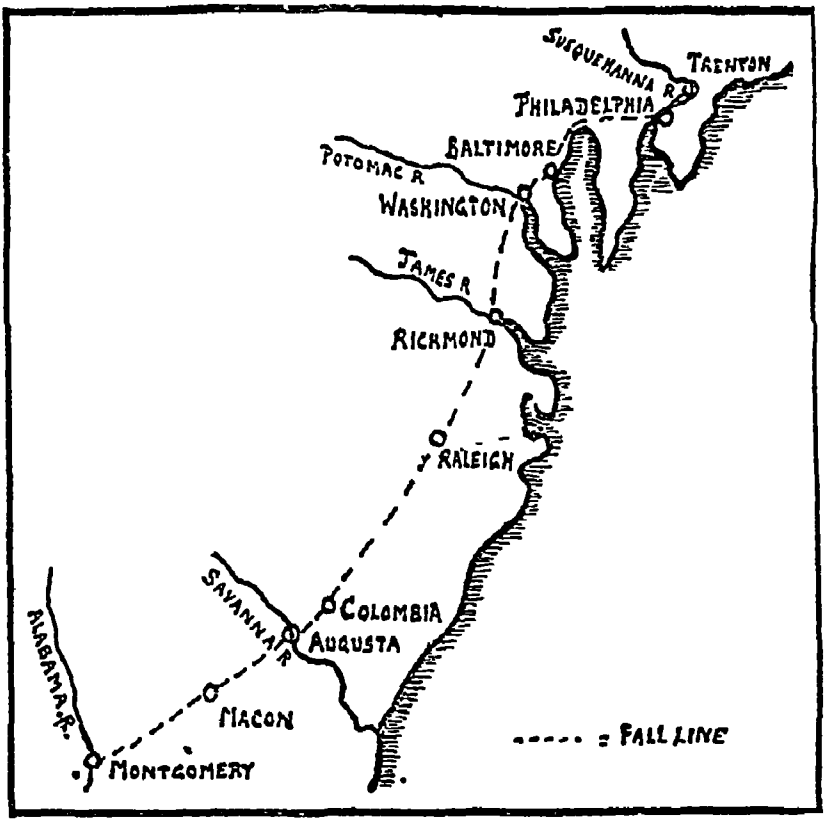
We have in Chapter VI already indicated the main coalfields of the U.S A. and outlined the mineral distribution, so that we can now attempt to define the economic regions. This is not an easy matter as so many of the states engage in manufacturing and mining as well as in agriculture, and this makes it difficult to classify the region in simple broad divisions. The following suggest themselves :—

1. The tobacco-growing states.
2 The cotton-growing states.
3. The Central Plains : (*a*) East of 100° W. cereals predominate; (*b*) West of 100° W. pastoral industry predominates.
4. Industrial region based on the great Pennsylvania, West Virginia and Alabama coalfield. The N.E. portion particularly important.

5. Mining and lumbering of the Rockies.

6 The Central Valley of California (Mediterranean climate and products)

7. Texas, the largest state, which engages in practically every industry. For instance, it produces much coal, oil and other minerals In addition



"Fall" line towns

it has an extensive live-stock industry and produces cotton, tobacco, rice, sugar and maize.

Now in dealing with the Atlantic trade of the U.S.A. it is difficult to say exactly how much of the products of the Western States is exported via eastern and how much via western ports. We assume that San Francisco is the outlet for all the exports of the central valley of California, and that the ports on

Puget Sound are the outlets for the exports from Washington and Oregon. We can consider these regions when we deal with the Pacific routes.

Of course it is obvious that much of the trade from these ports will ultimately find its way into the Atlantic via the Panama Canal, but it will simplify matters in this chapter if we are not concerned with details of the Pacific ports' trade.

We have discussed the tobacco and cotton production elsewhere. So our purpose will be best served if we concentrate our attention on (1) the central plains; (2) the chief mineral productions and industrial districts dependent on these and other raw materials.

Let us, then, consider the central plains first.

The chief cereals produced are wheat, maize and oats, the crops of which are the largest in the world. The chief wheat producing states are Minnesota, Kansas, North and South Dakota and Nebraska. Oats are grown in all the central states. Maize is grown chiefly in the states immediately east and south of Chicago, *i. e.* Indiana, Illinois, Iowa, Missouri, Nebraska, Kansas, Ohio and Oklahoma, and, as we have seen, in Texas. But practically all the states east of 100° W. longitude produce "corn," as the Americans call it.

It is estimated that the U.S.A. produce one-fifth of the world's wheat crop. This they can do largely owing to the extensive farm holdings, which enable the maximum use to be made of labour-saving machinery. Moreover, the climatic conditions are as a rule so steady that a farmer can with a modern American machine cut, thresh and bag the corn in one operation. Such a machine takes as many as thirty horses to draw it. Ploughing, too, can be done by tractors which plough many furrows simultaneously. All this makes for large crops and saving of time and labour.

In 1916, when the food supply of Europe was seriously threatened by the submarine warfare, the

USA farmers gathered the record harvest of over 1000 million bushels of wheat The average yield is in America generally about 720 million bushels

Maize and oats are grown more extensively than wheat, but their value in the export trade is not nearly so great. As a matter of fact comparatively moderate quantities of maize are exported, as most of it is used for home consumption, which means that it is used for fattening animals for the Chicago canned meat trade

There is naturally a great milling industry in the USA This is carried on at places like Minneapolis and St. Paul, Milwaukee, Duluth and New York, from which the produce can be easily dispatched. The exports of flour are generally valued at about £10,000,000

Now how does this vast quantity of foodstuffs reach the ports for shipment? A Minnesota farmer, for instance, naturally sends his stuff to the Great Lake ports—either Duluth or Fort William. Here it will be stored in great elevators until it is required, when it will be shipped to Buffalo, and from there by either the Erie Canal or rail to New York. As a matter of fact nearly all the grain reaching New York comes by rail.

A farmer in one of the states further south might, on the other hand, send his grain by steamer down the Mississippi to New Orleans. The freights would be cheaper than sending it by rail to New York, but as this latter town is the great grain port and has special facilities for handling and shipping great quantities of stuff, and as it is nearer the European ports than New Orleans is, the farmer may elect to pay more in freightage in order to ensure quicker delivery.

It seems that the best lands for cereal growing have already been utilized in the States, but there is plenty of good land still left in the Western Provinces, where the lack of rainfall is made good by a very extensive use of irrigation, drought-resisting wheats

and dry farming. As an example of what American irrigation engineers can do we may cite the case of the Gunnison River in Colorado, which was actually diverted from a deep cañon and made to flow along a tunnel through a mountain range in order that it might irrigate a valley on the other side of the mountains.

The live-stock industry of the U.S.A. is no less remarkable. The number of sheep and oxen have declined somewhat during the last ten years, but pigs and dairy cattle show a steady gain in numbers.

The numbers (in round figures) of live stock in the States in 1918 were:—

Horses and mules . .	26 millions
Dairy cows	23 ,,
Other cattle	43½ ,,
Sheep	49 ,,
Swine . . .	71 ,,

Australia and the Argentine have each much larger flocks, but cannot compete with the U.S.A. as regards the numbers of other live stock. The sheep farms are mainly in the states west of the 100° W. longitude, and pigs in the states east of the line, especially in Iowa, Indiana, Illinois and Ohio. Cattle and horses are reared in the central and western states and Texas. The industries dependent on the supply of live stock include, besides the usual dairy produce: (1) The greatest canned and preserved meat industry in the world; (2) leather and boot and shoe manufactures.

1. The canning industry is centred at such places as Chicago, Cincinnati, Omaha, Kansas City, etc., where there are large stockyards and factories.

The stockyards of Chicago, for instance, deal with nearly two million live animals yearly, and a single pen in the yard may hold as many as three hundred head of cattle. The slaughter-houses, packing-establishments, live animals and carcasses are all rigorously inspected by an expert Government staff, who

are evidently kept well employed, seeing that they may have to inspect as many as 57 million live animals and their carcasses in the course of a year

2. The boot and shoe factories are situated at Lynn (Mass.), Milwaukee, New York, Worcester, Boston, etc.

You should notice how ports are chosen as sites for factories.

Other raw products which lead to most important industries are fish and timber. The fishing in western waters and round Alaska in the Columbia River (noted for salmon) and the Great Lakes leads to a vast canning industry in Washington and Alaska, etc. The canning and freezing of fish is done by elaborate machinery, which renders possible a very large output.

The U.S.A. Board of Fisheries is very efficient, and is doing valuable pioneer work in the scientific study of the distribution and breeding of fish. Any state which has suitable lakes or rivers can have them stocked with eggs and young fish from the Government hatcheries. In this way the value of the States' fisheries is greatly enhanced.

The American Forestry Department is doing similar good work.

It is estimated that in America the present rate of cutting timber exceeds the annual growth. This fact, coupled with the great demand for all kinds of wood, makes it necessary for the Government to supervise very carefully their timber resources. Certain large areas of forests are set apart as Government reserves, and there is an elaborate organization for dealing with forest fires.

The tendency is for the lumber centres to move further west, so that now the principal lumber-producing centres are such states as Washington, Oregon, California and Montana. The Yellow Pine, Oregon Pine and Douglas Fir are the chief soft woods. Oak is the most important hard wood.

Pulp and paper making are naturally important industries in many places.

CHAPTER XXXVII

THE U S A. (*continued*)

Minerals, Metals and Manufactures.—The U.S.A. produce metals and minerals on such a large scale that it is impossible, within our limits, to survey all of them. The most important of them we have already indicated. They are: coal, iron ore and copper.

The following figures show the three chief coal-fields' production and, incidentally, how Pennsylvania easily leads in output.

	Output in 1913 (tons)
Pennsylvania .	. 155,000,000
West Virginia	63,000,000
Illinois .	55,000,000

Iron ore comes from many states, but especially from Cleveland and the Vermillon and Mesaba ranges in Minnesota

The copper mines of the Keeweenaw Peninsula are the greatest in the world.

The following Table shows the localities of the principal metals. It will be seen that the deposits are chiefly in the states which flank or include portions of the mountain barriers.

Copper.—Michigan (1st in production), California, Colorado, Idaho, Nevada, Alaska, etc.
Zinc.—Missouri (1st), Colorado, Wisconsin, etc.
Lead.—Missouri (1st) California, Colorado (Leadville).
Silver.—Nevada, Montana, Utah, Colorado, Idaho
Gold.—California, Colorado, Nevada, Alaska (Nome–Yukon Basin).

Salt is found in Kansas, Ohio, Utah and other states. New Almaden in California is noted for quicksilver, aluminium ores occur in many states, and the eastern states in particular produce large quantities of building stones, limestone, gypsum clays and phosphates

Thus there have grown up as subsidiary industries manufactures of pottery, glass, bricks and tiles, cement and chemicals Nearly all the states produce large quantities of Portland cement.

We have now to consider the chief manufactures which we have not hitherto mentioned. They are. (1) Textiles, (2) Iron and Steel.

A useful clue to the sites of manufactures in the U.S A is the fact that many towns (Birmingham for example) take their name from the corresponding English towns which engage in similar industries.

The principal textile factories will, of course, be located within or in easy range of the states supplying the raw materials of cotton and wool. Possibly they will be on the "fall" line, or at any rate where fuel and motive power are cheap.

You should examine the following list and see how far each town site satisfies these requirements.

Lowell (Mass)	Cotton.
Fall City (Mass.)	
Paterson (N.Y)	Silk
Scranton (Penn.)	
Raleigh .	Cotton and clothing.
Baltimore	
New York .	Clothing and woollens.
Philadelphia .	
Syracuse, etc.	

Examine the distribution of iron ore and coal and you will see that the industries dependent on these raw products must necessarily be within reasonable distance of the Great Lakes' iron-ore regions and

centre on the great coal deposits stretching from Pennsylvania to Alabama.

Pittsburg (the ancient Fort Duquesne) is the centre of the iron and steel industry because—

(1) It is a confluence town.
(2) It is on a great coalfield.
(3) It is close to the iron ore of Cleveland.
(4) It has valuable supplies of oil and natural gas.

Cleveland, Youngstown (Ohio), Duluth and Gary also have large blast furnaces. Connellsville is noted for its coke production.

Many of the towns specialize in some particular form of iron or steel goods. In 1901 some of the principal concerns amalgamated into one company called the "United States Steel Corporation." This company now has the colossal capital of something like £275,000,000, and owns coal mines, two-thirds of the ore output, natural gas supplies, gas, iron and steel works, a fleet of ore-carrying steamers on the Great Lakes, and docks at Conneaut on Lake Erie.

In 1910 this company's output was estimated at 10 million tons of pig iron, 11 million tons of steel ingots and 16 million tons of finished steel products. It could, in fact, turn out anything from a nail to an elaborate steel bridge. It is obviously very powerful commercially because it can control two-thirds of the ore supplies of Lake Superior. But it by no means has matters all its own way, and its trading capacity is no longer so superior to that of other private companies as it once was.

Let us see how the raw product reaches the factory or blast furnace.

The best iron ore will be quarried in the Hull Rust mine at Hibbing in the Mesaba range. The mine is really like one of the great slate quarries in North Wales, *i. e.* it is a large open pit half a mile wide and some two miles long. The ore will be

scooped up in steam shovels and deposited in railway trucks which are hauled to Duluth eighty miles away As the train runs into Duluth it passes over a weighing platform which automatically records the weight of each car as it passes The ore is then dumped out of the trucks into "pockets" on the quayside, which are connected by long pipes with the hatchways of a waiting vessel. The ore is then shot down the pipes into the ship's hold The vessel will then steam for, we will say, the port of Conneaut, where it will be unloaded, at the rate of over 3000 tons an hour, by ingenious machines which will pile the ore into stacks, to be removed by further machinery to the blast furnaces, if they are on the spot, or railed to the Pittsburg furnaces or wherever it is wanted

Pittsburg specializes in glass making (especially telescopes) as well as in steel goods; Waterbury turns out clocks and watches, Springfield, Syracuse and towns like Chicago on the verge of the prairie districts specialize in agricultural machinery Michigan provides 75 per cent of the annual output of motor-vehicles in the U.S A In the south, on the Alabama coalfield, there is a rising industrial area marked by towns such as Birmingham, noted as its English namesake for hardware.

Let us now turn to problems of transport The U S A is well provided with natural waterways and water power. Many of the rivers are navigable for long distances It is reckoned that the Mississippi system has over 4000 miles of navigable waterways The main stream can be ascended as far as the falls of St Anthony. The Ohio (with one interruption at the falls of Louisville) is navigable to Pittsburg, the Alabama is navigable for 400 miles and the Missouri to Sioux City In Texas State there are over 1000 miles of water good for transport. Yet, with the exception of the Great Lakes, traffic on the rivers is decreasing. Why? Because of railway

competition and the slowness of water transport. For instance, the Mississippi is still useful for transporting a certain amount of such bulky articles as grain, lumber and coke, but it is not nearly so important a traffic carrier as it was, and on practically all the sections of the river traffic has of late decreased. The Erie Canal is in much the same position. Ten years ago New York received 7 million bushels of wheat by the canal and Hudson River as compared with 96½ million bushels by rail. In 1918 the figures were respectively 617,000 and 180,600,000 bushels.

On the other hand, the Great Lakes traffic increases every year, and in 1917 was valued at about £200,000,000. This shows what a vast commerce passes along the lake routes, especially when we remember the winter restrictions to trade in these waters.

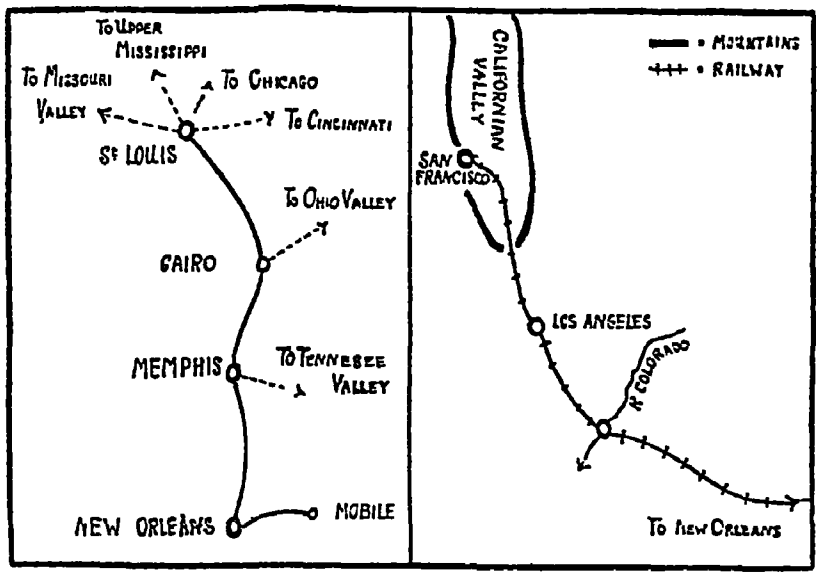
The railways of the U S.A. have developed at a great pace, and there are now 266,000 miles of rail in the country. A close analysis of such a system is not possible or desirable, but with the aid of a physical map it is simple to make out the following main routes:—

1. From New York via Hudson—Mohawk Gap to either the Great Lakes (Buffalo), or the St. Lawrence (Montreal).
2. From New York south-westwards along the piedmont belt through the cotton and tobacco states to the Gulf ports.
3. Philadelphia via Hoosac Tunnel (4½ miles long) to Pittsburg, Chicago, Omaha, across the Great Salt Lake to San Francisco. This is called the Central Pacific Railway.
4. Northern Pacific connecting Portland with Minneapolis and St. Paul and the Canadian border towns.
5. A line running from Washington via St. Louis, Santa Fé to Los Angeles.

6 Southern Pacific—New Orleans via Yuma and Los Angeles to San Francisco
7. A central railway connecting the Mississippi towns St. Louis, Cairo, Memphis, New Orleans.

Nor must we forget to mention the remarkable railway from Florida across the Coral Islands to the important naval base of Key West.

As we said before, you should trace out the connection between the railway routes and the physical



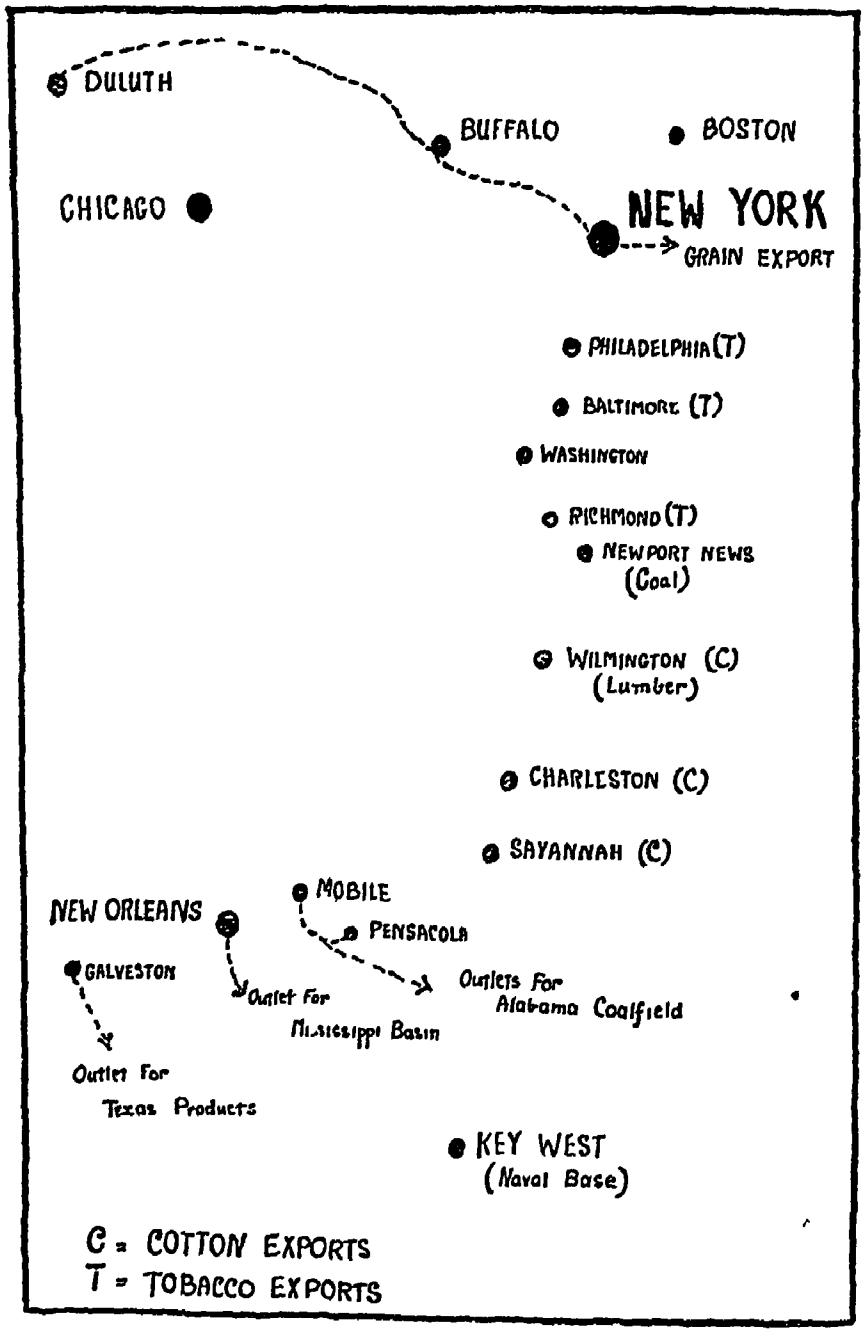
features Particularly does this apply to the routes across the eastern mountains

Note, too, how the lines link up the principal ports, and the superiority of New York over any other Atlantic port owing to the easy passage afforded by the Hudson Gap.

The following are obviously nodal points · Chicago, Cairo and St. Louis. You can find many others

A rough (not an elaborate) diagram, as either of those here shown, always helps to clear up matters It need not be drawn to scale

Then, too, it would not be amiss to space out (again roughly) the Atlantic ports thus:—



Now let us take a general survey of the U.S.A.'s trade and shipping. We had better refer to figures

prior to 1914, for the war has created abnormal conditions, as the following figures show clearly —

Exports from U S A , 1909–1910	Exports from U S A , 1918
£342,016,790	£1,183 942,274

According to the statistics in the *Statesman's Year Book* the chief exports from the U.S A , in order of importance, were Raw cotton, foodstuffs, iron and steel goods, mineral oils, copper (raw and manufactured), wood and manufactures thereof, leather and leather goods, tobacco (raw and manufactured).

The chief imports were Hides and skins, sugar, indiarubber, chemicals, drugs and dyes, silk (raw and manufactured), coffee, wool (raw and manufactured), fibres (raw and manufactured), diamonds and precious stones, fruits, spirits and wines, etc

By far the greatest proportion of trade was carried on with Europe (United Kingdom first, Germany second, France third). North America was next on the list, the trade with South America was roughly equal to that with Asia There was a comparatively small trade with Australasia and even less with Africa

It would be an interesting exercise to trace out the destinations of the above imports and exports For instance, much of the trade with France could, as regards imports, be fairly assigned to such articles as silk, silk goods and wines.

Cuba and Hawaii would figure in the sugar import trade, Germany in the chemical and dye imports. The United Kingdom's exports to America vary little from year to year and are mainly cotton, linen and woollen goods

The percentage of trade carried on by the different groups of ports of the U S A. worked out as follows in 1909–1910 —

The Atlantic and Gulf ports 82 per cent. The rest 18 per cent. (Pacific Coast 4·90)

Conditions were much the same in 1919. So it is clear we were correct when we said in Chapter XXXVII that considerations of the west-coast trade of U.S.A. would not disturb our calculations as regards the Atlantic trade.

As regards the share of individual ports, New York was first with 48 per cent. and the rest were nowhere; Boston, for instance, the second port, only taking 6 per cent.

The carrying trade was largely in the hands of the British mercantile marine. Our ships entered and cleared amounted to 20 million tonnage. Germany was next, but a long way behind, with a tonnage of 8 million.

The U.S.A. ships carried but 8·7 per cent. During the war the Americans made great efforts to increase their mercantile marine; so that in 1918 their ships carried 41 per cent. We shall have to watch carefully this growing competition in the carrying trade.

CHAPTER XXXVIII

SOUTH AND WEST AFRICA

To complete our survey of Atlantic trade we have to study the economic conditions of West and South Africa

We have here—(1) A tropical region containing typical coastal plains backed by the basins of two great rivers, the Niger and the Congo (compare the Amazon Basin) Typical tropical climate, little seasonal variation; heavy rains, diminishing inland; dense forests, thinning out inland to savannah type of country.

(2) South Africa, which we may take as Africa south of the northern boundary of Rhodesia. Sub-tropical and tropical coastal plains, backed by the great plateau of South Africa, with a steep seaward escarpment cut into by rivers (*e g.* Zambesi). The land rises inland by a series of scarps and plateaux. Thus a section from south to the Orange River in the north shows—

where C P = Coastal Plain
L K = Little Karroo.
G K = Great Karroo.
O = Orange River.
H V. = High Veldt.

Except for the area round Cape Town, which receives at one season the westerly winds and in the southern summer the S.E. trades, and therefore has

a Mediterranean climate, the prevailing wind is the S.E. trade which, naturally, in conjunction with the physical features, causes the rainfall to diminish from east to west. Note, too, that the lack of rainfall on the S.W. coast is accentuated by the cold Benguela current, whereas the heavier rainfall on the east is assisted by the warm Mozambique current.

The vegetation belts correspond to the rainfall, so that we have forests on the eastern coastal plains followed by savannah and "down" or "veldt" country east of the Drakensberg Scarp, which passes into the scrub and desert of the Kalahari Desert.

We have, then, the following economic regions:—

1. Mediterranean area round Cape Town, with typical Mediterranean products.
2. Tropical forest areas, with usual products.
3. Sub-tropical coastal plains of S.E. Africa—sugar.
4. Farming area (mainly pastoral) of interior—savannah type in Nigeria and Rhodesia.

Let us add the following mineral areas:—

(*a*) Gold mines of Johannesburg (Transvaal) and Rhodesia. Alluvial gold of the Gold Coast.
(*b*) Diamonds of Kimberley, Orange River Colony and Transvaal
(*c*) Coal—Natal (Newcastle), Transvaal, Orange River Colony, Rhodesia (Wankie).
(*d*) Tin—Nigeria.
(*e*) Copper—S.W. Africa.

Now gold and diamonds do not lead to manufacture, iron ore in South Africa is as yet undeveloped, coal is not produced on a really extensive scale, so that it is clear South Africa is not likely at present to be a manufacturing country on a large scale. Her exports will be rather in the nature of raw products. This will essentially be the case with the great tropical areas in West Africa.

So much for a general statement Let us consider details. We will take South Africa first

As we might expect, wool is the staple commodity We include under "wool" the valuable mohair of the Angora goat, large flocks of which are reared in South Africa The export of wool has steadily risen and is now about double what it was in 1913 The United Kingdom takes most of the annual clip, but the sales to the U S A are increasing

The war has given a great impetus to the exports of foodstuffs from South Africa Mediterranean fruits such as oranges, lemons, peaches and apricots, all flourish in the S.W. area, and will probably lead to a considerable export trade in dried and canned fruits. Cape Colony also produces grapes and wine, especially round Stellenbosch, Paarl and Worcester.

The sugar-cane flourishes in Natal, and the sugar industry has grown, despite war conditions. The total output for 1918 was a record, and much sugar was exported; a fresh market, for instance, being found in the Argentine.

Before 1914 South Africa imported over £7,000.000 worth of foodstuffs and exported a negligible quantity The latest figures show exports valued at more than £4,000,000 and imports reduced by £3,000,000 The export of frozen meat was a noteworthy feature There is evidently much scope here for further developments Let us turn to mineral productions

There is an important coalfield at Wankie in Rhodesia, through which passes the Cape to Cairo railway. Thus the coalfield can supply the locomotives and also the copper mines of Katanga (Belgian Congo) further north. Natal coal is largely used for bunkering purposes at Durban and is also exported to India, the Argentine and Uruguay. The main collieries lie between Newcastle and Elandslaagte The output is annually about 3 million tons The mines of Middleburg and Witbank in the Transvaal are

even more important and produce double the Natal quantity. Much is exported to India via Lorenço-Marques. Copper is mined in the N.W. of the Cape Province and in what was German South-west Africa. Port Nolloth is a port of shipment.

Diamonds are found in the Transvaal near Pretoria. It was here that in 1905 was found the famous Cullinan diamond weighing nearly 2 lbs.

Jagersfontein in the Orange River Colony is another centre of production, and most famous of all are the mines of the De Beers Company at Kimberley.

The diamonds are found in a deposit of "blue ground" which is dug up and allowed to disintegrate in the sun. It is then submitted to various processes, including washing, and the diamonds are sorted out by natives who live in compounds and have to be carefully watched and searched to prevent their thieving.

Gold mining has been in practice in South Africa for generations. The ruins of the old gold workings at Zimbabwe in Rhodesia are supposed, with probability, to date back to the days of the Phœnician traders.

The most important gold mines in the world are, of course, those of the Rand district near Johannesburg. Since 1886, 280 million tons of ore, it is estimated, have been mined. The output has steadily increased, and in 1916 reached the record annual value of £38,000,000, or 41 per cent. of the world's gold output. There is considerable difference of opinion as to how long these resources will last at the present rate of production and in view of a possible increase in the cost of production. At any rate there seems no reason to doubt that the £40,000,000 mark will be reached in the near future.

The ore is mined, sometimes at a great depth, and then crushed and submitted to chemical processes by which the gold is extracted. Much power—

electric and otherwise—is required to work the machinery, and labour must be plentiful and cheap Some idea of the wealth obtained from the mines may be gathered from the fact that in 1887 the dividends paid by the mining companies amounted to £13,000, whereas in 1909 they had risen to £9,500,000

Other minerals, such as chrome iron (Rhodesia) and silver (Transvaal) are important In fact, the mineral possibilities throughout South Africa are promising.

The agricultural and pastoral prospects, especially in Rhodesia, are also great, and our new territory in what was German South-west Africa is said to contain some of the finest ranching country in the world.

Turning now to West Africa, we find the usual tropical products such as rubber, cacao, copra and hard woods (*e g.* mahogany), together with the valuable oil palm, ground-nut, kola-nut and copal, a gum exuded from certain species of trees Senegal and Gambia are noted for ground-nuts, which are exported to Marseilles and Hamburg Palm oil and palm kernels come from Southern Nigeria, the Gold Coast and Belgian Congo, which also produces ivory. The same regions produce copal Sierra Leone exports kola-nuts to Bathurst, Senegal and Portuguese Guinea, where they are in great demand by the natives.

The cacao industry is growing, but is hampered by transport methods and unscientific native culture Much better cacao is produced in the islands in the Gulf of Guinea There is an ancient trade in leather at Kano, an important caravan centre in Northern Nigeria, where large flocks of goats and sheep are kept in the more open savannah country

The cotton plant is indigenous to Nigeria, and, thanks to the efforts of the British Cotton-growing Association, the industry is rapidly gaining ground

The great drawbacks to the trade in this part of Africa are:—

1. Lack of transport facilities.
2. Want of more skilled and better labour supply.
3. Bad harbours.

As an indication of the primitive means of transport employed we might mention that in the Gold Coast the cacao beans are conveyed to the port of shipment by being loaded into bags, which are then placed in casks to be rolled along the roads by hand to their destination.

Most of the West African trade is with the U.S.A., the United Kingdom and Europe.

Transport facilities are, in fact, the great need throughout Africa.

Nigeria is what we call a "go-ahead" country. Yet 975 miles of rail can hardly be called adequate for an area three times the size of the British Isles and with a population of 16 million.

A new line of 550 miles which is being constructed from Port Harcourt on the Bonny River will do something to remedy these shortcomings.

The Congo and its tributaries afford thousands of miles of navigable waterways, but only in discontinuous stretches. The many falls on the main stream have been avoided by short lines of railways at several points, but of course this means "breaking bulk" very often.

In 1915, 167 miles of rail were constructed to link the Upper Congo with Lake Tanganyika where it connects with the railway from Ujiji to Dar-es-Salaam on the east coast. At Elizabethville on the Upper Congo is the present terminus of the Cape to Cairo railway—2300 miles from Cape Town.

If we wanted to send goods from Elizabethville to the coast there would, then, be three ways of doing it.—

1. Via Lobito Bay railway to west coast
2 Via Cape to Cairo railway to Cape Town.
3 Via Congo and rail to the port of Boma

The last route would, for the reasons outlined above, hardly be chosen In any case it would be a very tedious journey and might occupy several months

The first-named railway links the Upper Congo with the west coast. It is surprising to find that in 1913 as many as 63,000 passengers and as much as 27,000 tons of freight were carried on this obscure stretch of line.

What is wanted are more cross lines connecting the main Cape to Cairo route with the east and west coasts Only in this way will the full benefit of Cecil Rhodes' scheme be realized

C—THE SUEZ ROUTES

CHAPTER XXXIX

THE SUEZ AND INDIAN OCEAN ROUTES

We are here dealing with several streams of traffic. First we have the Suez route to India and the Far East; then there is the Australian route from and to Europe via Suez, and from and to the E. Indies, India, China and Japan, a much less important traffic between India and South Africa, and, lastly, additional tonnage to the Suez traffic coming from East Africa and the Persian Gulf ports.

The Australian routes will be more conveniently dealt with in the next chapter. The other routes can be sufficiently dealt with incidentally, with the exception of the first named, which is so much the most important that on it we had better concentrate our attention. This route serves what is generally known as the monsoon region of Asia.

It is assumed that the student has an elementary knowledge of the climatic features of this region, but we draw attention to the following points:—

1. The distribution of rainfall is all important: *e.g.* failure of the monsoon wind in India means a greatly lessened food production—possibly famine.

2. The rainfall is controlled by the physical features. In this connection note that the direction of the prevailing winds varies according to the country considered. Thus the S.W. summer monsoon of India becomes S.S.E. and even E. as we work eastwards, and the winter monsoon is N. and N.W. in N.E. Asia and N.E. in India.

A rainfall map shows—

(*a*) Exceptionally heavy rains on the seaward scarp of the Western Ghats, in the Assam Hills, E Indies and West Pacific generally.
(*b*) Areas of well distributed, moderate or light summer rainfall on the Dekkan and in China (with which *cf* the U S A)
(*c*) Arid areas in Sind and the Punjab

3 The intense cold of N E. Siberia in winter causes abnormal cold far south in China and lowers the temperature of Japan, both of which will therefore have greater seasonal extremes of climate than the countries of S and S E. Asia

China and Japan, in other words, will not produce the characteristic products of the monsoon countries further south.

On the whole the vegetable products may perhaps be divided most conveniently thus —

1. Tropical—usual plants, *e g.* rice, sugar, rubber, etc.
2 Sub-tropical—cotton, tea (on hill slopes)
3. Temperate cereal crops of North China and Manchuria.

In more detail —

Rice universally—especially in river deltas and irrigated lands in China and Japan.

Sugar and cacao—Java and Sumatra.

Coco-nuts and spices—Ceylon, Madras Coast, East Indies.

Rubber—much the same distribution as coco-nuts.

Tea—Assam, Darjeeling, China, Formosa, Japan.

Teak flourishes in Burma and India (W. Ghats); mulberry trees and hence silk, in China and Japan.

Raw tropical and sub-tropical products will, then, be a feature of trade in the monsoon countries.

Adding mineral wealth we have—

1. The greatest tin deposits in the world—Straits Settlements, Malay States, Dutch East Indies.
2. Petroleum—Burma, Borneo, Sumatra.
3. Copper—Japan and China (Yun-nan).

Coal and iron ore are found extensively in China, less so in India and Japan. Thus these three countries are the only ones likely to manufacture on a large scale, and they will be in a position to supply the other monsoon countries with a certain amount of manufactured goods. This is, of course, supposing their manufactures are sufficiently developed, which, as we shall see presently, is not so in every instance.

At any rate we shall not be far wrong if we state as a general rule that exports from the monsoon region will be raw products, imports will be manufactured goods (see Chapter II).

Let us examine in more detail the trade of the three principal countries · India, Japan and China.

The chief exports of British India before 1914 were, in order of importance: cotton, raw and manufactured; jute, raw and manufactured; oil seeds; hides and skins; rice; tea; wheat.

As we might expect, the U.K. took the greater proportion of these products, China, Germany, U.S.A., France and Japan being the other principal customers.

In 1918 the order was U.K, U.S A., Japan, Egypt, France, China.

Of course we must not forget that exports to the British Isles are often destined to be re-exported to the Continent. But, though this may affect the consumption figures, it does not affect the carrying-trade statistics.

We will examine more fully the chief items on the export list.

For the cotton-growing areas see Chapter V, where we also said that the Indian crop is large but of low

quality Seeing that the cotton export is of vital importance to India, this latter point is of interest According to the "Report of the Indian Industrial Commission, 1916–1918," the Commissioners, to secure a better quality crop, make the following proposals —

1 To improve the existing short-staple types of cotton by developing, through crossing or selection, a larger and better fibre
2 In suitable areas to continue and intensify the present attempt to introduce larger staple exotic cotton.
3 To make more systematic efforts to provide a free and effective demand for improved cottons and to see that they reach the buyer in an unadulterated condition
4. To improve marketing arrangements generally.

The above principles, if carried out, are, the Commissioners think, the best calculated to give the speediest and most economical results

The following figures show the average export of raw cotton from India for a period of five years (1909–1914).

Principal countries to which exported	Bales of 400 lbs
U K	120,600
Japan	1,012,500
Germany	350,600
Belgium	276,600
Italy	233,000

The total value of raw cotton in 1913–1914 was £27,362,000.

In addition, India exports large quantities of cotton twist and yarn to the Far East. especially China, and cotton piece goods to the Far East, Persia, Ceylon and East African ports. These manufactures are made in the mills at Bombay, Nagpur, Ahmedabad,

Cawnpore, etc. In 1916 there were 266 cotton mills in India, employing 274,361 hands daily. Of these mills Bombay possesses 86. Nevertheless, cotton manufactures are still the largest item on India's import list, and are annually valued at many millions. Most of these goods come from the U.K.

Like cotton, jute is exported either raw or in a manufactured state. The raw material goes chiefly to the U.K., Germany and the U.S A. Jute manufactures, especially sacks, go to all the principal countries of the world, but the U.S.A., Argentine and Australia are the principal customers. It would not be difficult to say why these countries should require these articles on a large scale.

The Calcutta jute mills number 71 and employ 260,200 persons. As we have noted before, Dundee is the largest jute manufacturing town in the world. The Calcutta mills are generally managed by Dundee experts and run by a staff who are largely of Scottish descent.

The annual average value of the jute trade to Bengal has been assessed at £40,000,000

Other important raw products are wheat (exported chiefly to U.K., France and Belgium), hides and skins (raw and tanned) to the U.K. and U.S A., and, before the war, to Germany and Austria. The average export is nearly 100,000 tons. Oil-seed exports are also valuable and are as under :—

France—Linseed, cotton seed, castor seed and ground-nuts.

U.K.—Linseed, cotton seed, castor seed and ground-nuts.

Belgium—Rape and sesamum.

Germany—Sesamum.

The importing ports will be Hull, Antwerp, Hamburg and Marseilles.

India has a larger acreage under sugar-cane than

any other country in the world, but, strangely enough, she has to import large quantities, and in fact the sugar imports before the war were exceeded only by those of raw cotton This unsatisfactory state of things is due, among other things, to—

(*a*) A poor type of cane

(*b*) Inferior methods of culture in the sugar-producing areas of the United Provinces, Bihar, Bengal and the Punjab

(*c*) Small holdings, which mean the impossibility of securing a regular supply requisite for a modern central factory.

The figures of the average sugar imports for the five years 1909–1914 show that out of a total of 633,500 tons Java supplied 453,000 tons and Mauritius 128,800 tons The latest figures, however, show a decided decrease in the imports and an increase in the home production of over 900,000 tons

The imports from Java go mainly to Calcutta and Bombay, and the latter port accounts for 96 per cent. of the Mauritius imports.

The tea exports of India and Ceylon are annually increasing in value, and the industry in India alone employs over 700,000 people.

The tea is shipped in huge quantities to London, and in much less bulk to such countries as the U.S A. and Australia In addition, over a million pounds is exported inland across the frontier to Persia and Asiatic Turkey.

Tea is either "black" or "green" according to the different treatment it undergoes in the process of preparation.

The market for China teas in the U K. and Australia has decreased considerably during the last few years, but there is a great demand for it in Asiatic Russia, whither it is exported either via the Trans-Siberian railway or by steamer to the Black Sea port of Batoum, from where it is distributed by rail The

chief tea-growing regions are in the basin of the Yangtse, and Hankow and Shanghai are the chief ports of shipment. Inferior leaves and stems of the tea plant are pressed by the Chinese into cakes or "bricks" as they are called, and this brick tea is transported overland over very difficult mountainous country by Chinese coolies, who carry as much as 300 lbs. at a time. When the Tibetan frontier is reached the tea is exchanged for hides with the Tibetan Lamas, who retail it out at an exorbitant price to the native population.

Formosan and Japanese teas find a ready market in the U.S.A., and the former is very much advertised in this country.

Indigo and opium are other interesting exports from India. Both are grown in the Ganges basin and exported from Calcutta. Patna is the centre of the opium industry. It should be added that the production of synthetic dyes has greatly endangered the native indigo industry, but that the indigo planters are making every effort, by improved scientific culture, to withstand the competition.

The mineral resources of British India are considerable. The Shan States of Burma produce lead and zinc ores, South Burma is one of the richest sources of tungsten in the world, and Bihar mica is of first-rate quality and much in demand.

The coal of India is unevenly distributed and generally of a poor quality. The average annual production is about 17 million tons, and could be easily increased were it not for the insufficient and intermittent supplies of labour. Iron ores are widely distributed, but as a rule are not near coalfields.

There are large manganese ore deposits in the Central Provinces, Chota Nagpur, Bombay, Mysore and Madras.

Two exceptionally important iron and steel factories are those of the Bengal Iron and Steel Co. at

Kulti and the Tata Iron and Steel Co at Sakchi, both being dependent on the Bengal coalfield

The Tata Co owns iron mines, limestone quarries, four large coal mines, producing between them 6 million tons a year, large blast furnaces, coke ovens and steel milling plants. The company's present steel capacity is 17,000 tons a month The rolling mills produce about 120,000 tons of rails yearly. Thirty thousand people are employed at the works, and Sakchi, which was formerly a mere village, now has a population of over 50,000.

But notwithstanding the increase in home production of iron and steel, India's main imports are still machinery, iron and steel goods and textile manufactures Most of these come from the U.K., but Japanese competition is increasing Before the war Japan was but sixth on the Indian import list · she is now third

Woods and forests, most of the railways and a vast irrigation canal system are all worked by the State through that efficient body known as the Indian Civil Service

Railways are particularly well developed and now total 36,000 miles in length. You should study a map of them and see how they supplement the great rivers as commerce carriers, and how their courses are dependent upon the configuration of the country.

Irrigation is practised on a large scale in the Punjab, Sind, Bihar and Orissa, Agra and Madras. There are 21,800,000 acres irrigated by canal. and other large tracts of land irrigated by wells and tanks

Better and more widely spread education and improved hygienic conditions are gradually being established, with much benefit to the large native labouring population, so that increasing commercial prosperity is assured.

In concluding our short review of Indian trade we add—

1. Diagrams showing the principal countries' shares in the import and export trade of India.

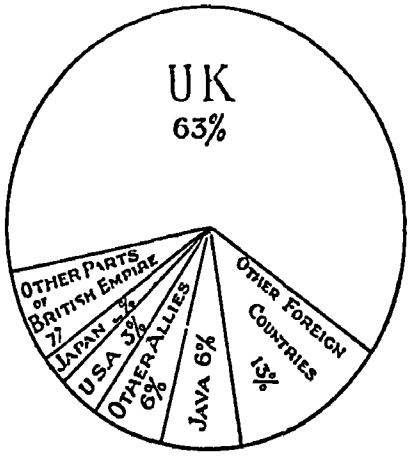
[The student should note the altered conditions due to the Great War. Particularly noticeable are the decrease of the imports into India from the United Kingdom, and the great increase in the trade with other parts of the British Empire.]

2. A comparison of the various factors controlling the commercial importance of Calcutta and Bombay.

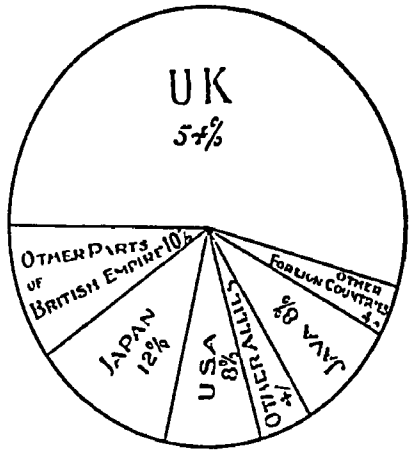
Bombay	*Calcutta*
Splendid harbour, backed by cotton district Cotton manufacture and export is staple industry. Also tanneries, flour mills and engineering works Hydro-electric power from streams of W. Ghats Disadvantages: (1) Coal has to be imported from long distances (*e. g* from Bengal by rail). (2) Lack of room for city development Population congested This often leads to outbreaks of plague Communications good Connected with (*a*) N. India by Bombay, Baroda and Central Indian Railway. (*b*) Dekkan, Central India, Gangetic Plain and Madras by the Great Indian Peninsular Railway.	On navigable river which carries annually a large traffic (*e g.* over a million tons in 1913) In centre of fertile jute and rice areas. Outlet also for Bengal coal and Assam tea Manufacture and export of jute is staple industry. Population not crowded Disadvantage: Hooghly is a dangerous river. Communications excellent Total volume of rail-borne traffic in 1913 was over 10 million tons. Notice—(*a*) East Indian Railway carries food, grains and seeds; (*b*) Bengal-Nagpur Railway carries coal, cotton and seeds from Central Provinces: (*c*) Assam-Bengal Railway carries jute and rice from North and East Bengal

Here we might mention the important tin, rubber and copra exports from the Straits Settlements and Federated Malay States. Singapore is the natural outlet for these products. It is one of those places which owe their importance to strategical position. guarding as it does the only passage through the narrow straits of Malacca. Mauritius is another

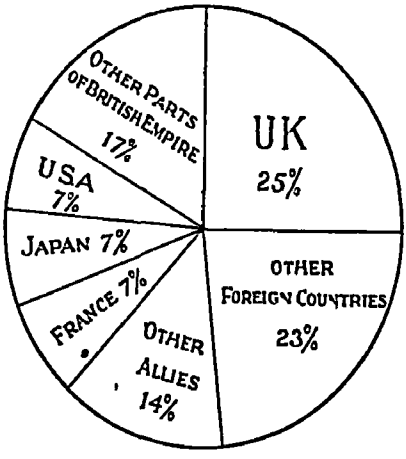
strategical point, and is of commercial value for its considerable sugar production.



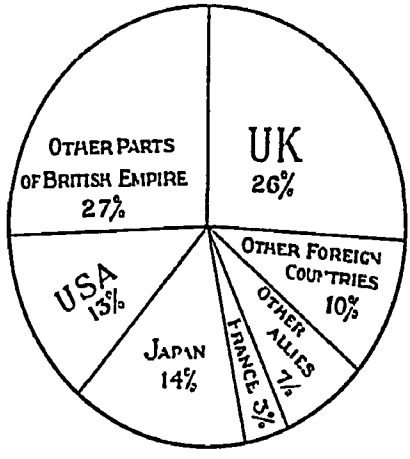
Share of Principal Countries in Import Trade of India Average 1909–10 to 1913–14



Share of Principal Countries in Import Trade of India, 1917–1918



Share of Principal Countries in Export Trade of India Average 1909–10 to 1913–14



Share of Principal Countries in Export Trade of India, 1917–1918

Now let us turn to Japan

The growth of Japan's trade has for some time past been remarkable, and her productions are now to be found in all the world's markets.

We can explain her success by remembering that

her resources are considerable, her population large, intelligent and industrious, ready to make the most of new ideas and opportunities and to work for very low wages.

We will take the principal items of Japan's commerce and examine their distribution in some detail. Exports are the main thing, as always, because the export trade is an index of a country's prosperity.

Principal Exports	Principal Customers (in order)
Raw silk.	U S A.
Manufactured silk goods	China.
Other textiles	Hong-Kong.
Matches	U.K.
Copper.	France
Coal.	India.
Tea	East Indies and Straits Settlements.
Refined sugar.	Australia.
Camphor	
Miscellaneous, such as brushes, buttons oil-cake, etc	

If we consider the geographical position and the requirements of the various countries, we shall have little difficulty in apportioning the exports to the right customers For instance, raw silk is not likely to come to Europe, with its great supplies from Italy and France. The only country manufacturing textiles on a large scale and within easy reach of Japan is the U.S.A. She is the customer, then, for this article. Cotton and woollen goods will easily find markets in the Far East, and by their cheapness may be expected to reach the markets in Canada, the Pacific Coast of the U.S.A. and Australia.

Copper is always acceptable and will go to any or all of the countries mentioned on our list. Coal will be useful at important ports such as Hong-Kong, Honolulu, Singapore, Penang, etc. Matches will also find markets in the Far East, and the forests and sulphur of Japan will supply the raw material for the match industry.

We get our tea supplies from India, Ceylon and China. Australia draws from the same markets.

So again the U S A is the only large customer likely to take Japanese and Formosan tea.

Another point whence does Japan draw her supplies, for manufacturing purposes, of raw cotton, wool, sugar and oil?

Some cotton will obviously come from China close at hand The U.S A. markets may supply some, but they are far distant compared with Indian markets The Indian crop is large, so that we shall expect this to be the principal source of Japan's supply.

Raw wool can easily be obtained from Australia, inferior kinds from India

Sugar supplies afford an interesting competition. There are three possible sources. home grown from Formosa, Hawaii, Java.

The former crop is likely to be preferred, but is not likely to be large enough to meet Japan's needs, so all three countries will import sugar into Japan.

Oil is another product in great demand in the ports of China and Japan. Again, there are several possible sources of supply: Burma, Borneo, Sumatra and California. As we have seen already, Rangoon oil goes westwards. The East Indian supply is limited, so that the largest and cheapest supply will come from California, whence it can easily be dispatched via San Francisco. There is also a growing home supply from new oil wells in Formosa

In addition, soya beans, for oil extraction, and soya-bean oil can be imported from Manchuria.

It might be expected that there would be a considerable trade between Canada and Japan. We shall see whether this is so when we come to study the Pacific trade routes.

Iron ore for steel manufactures can be obtained from China and in larger quantities from the U S A., for there are no nearer supplies available.

We must not, however, get the idea that Japan is essentially a manufacturing country, because as yet manufactures, though rapidly developing, form

by no means the chief part of her commercial wealth. The Japanese Empire is still largely an agricultural one, and Formosa, Korea, Japanese Sakhalin (or Karafuto) and the leased territory of Kwantung can as yet be considered only as agricultural countries.

The mountainous nature of Japan proper has been a serious obstacle to railway construction, but there are 8000 miles now open, serving an area of some 148,000 square miles and a population of 55 million. Note should be taken of the excellent means of communication afforded by the inland sea of Japan, and incidentally of the fact that the valuable fisheries in these waters afford a cheap food for the population.

You should also notice the railway through Korea, because it links up with the Great Trans-Siberian System. By this means Tokio is brought within a four days' journey of Pekin. During the war the South Manchurian Railway was advertising the following route between Europe and the Far East as the shortest and quickest route available:—

Tokio or Shanghai to London via Mukden, the Trans-Siberian Railway and Sweden. Time taken = 19 days.

Ordinarily, of course, the route would go through continental Europe and not through Sweden, and would be still shorter.

The same company also advertised the coal of the Fushun mines in South Manchuria (output 2 millino tons annually) as the best steam coal in the Far East, and as being available at the depots of Port Arthur, Tientsin, Singapore, Shanghai, Hong-Kong and Penang.

One can learn a great deal from simple advertisements.

The Japanese mercantile marine amounts to, roughly, 2 million tons.

Shipping companies for foreign trade are subsidized by the Japanese Government, and in this way the Japanese are becoming increasing competitors in the carrying trade. Two of the best-known companies are the Nippon and Yamashita lines. The former

runs steamers from Middlesborough and London to Tokio via Cape Town, Durban, Singapore, Hong-Kong and Shanghai.

The Swedish East Asiatic Co. have sailings from Gothenburg and Christiania to Yokohama, Kobe and Moji via Singapore, Hong-Kong and Shanghai The East Asiatic Co, with headquarters at Copenhagen, also ply between Japan and Scandinavia.

Practically all the trade of the Japanese Empire centres on the ports Kobe, Osaka, Yokohama, Tokio and Moji

Finally we must consider shortly that intensely interesting but commercially backward nation of China. Essentially the Chinese are agriculturists They are, in fact, the greatest market gardeners in the world They are adepts at making use of every inch of cultivable soil Their system of irrigation canals is extraordinary there is untold mineral wealth in the country, a mighty river, the Yangtse, navigable for over 1000 miles, and millions of labourers Yet the total trade in 1913 was scarcely larger, and in 1918 was £134,000,000 less, than that of Japan The main cause of this state of things is the innate conservatism of the Chinese people. Yet in many ways Chinese commerce is expanding, and when the country has really settled down to business according to Western ideas the development of trade should be phenomenal.

The staple articles of her commerce have already been discussed. We have only to add that her mineral wealth other than coal (15 million tons raised annually) includes first-grade copper ore from Yun-nan (500,000 tons annually), antimony from Hunan, extensive iron ore deposits in Shansi and near Hankow. The ore from the latter mine is either smelted for iron and steel which is used in the textile mills at Hankow, Wuchang, Shanghai and elsewhere, or is exported to Japan.

Tin (from Yun-nan) is the most important mineral export and is shipped from Hong-Kong. The railway

system is very inadequate considering the extent of country and vast population, which is variously estimated at between 300 and 400 million. Six thousand miles of rail are open and 2000 miles are under construction.

Most of the internal communication is by canals, rivers and roads, the latter of which are very badly kept.

We will now attempt to summarize the movements of commerce on the Suez and Indian Ocean routes. We have:—

1. A considerable tonnage outward from Europe via Suez to the Far East. Much of this will be in ballast, since cargoes will have been dropped at Mediterranean ports *en route*, and there are reduced canal dues for ships in ballast.

Most of the tonnage will be British and there will be a considerable passenger traffic. Cargoes are mainly textiles and iron and steel goods.

2. There is a large return tonnage for Western European markets, the cargoes being mainly raw products in bulk, such as cotton, oil, wheat, etc.

3. A small tonnage from South African ports to India and the Straits. Cargo—coal.

4. A certain amount of shipping working up the east coast of Africa and returning via Suez either in ballast or with cargoes of hides, coffee, coco-nuts, etc., from British East Africa, Uganda, etc.

5. Ships plying between Western Europe and Australia, the nature of whose cargoes we shall consider in the next chapter.

We shall also have to add a small stream of traffic from the Persian Gulf ports with important oil cargoes from the Anglo-Persian oilfields near Basra.

The student should by now have some idea of the main currents of trade in this part of the world. But he must understand that in such short space the detailed treatment has been necessarily very cursory and inadequate.

D.—AUSTRALASIA AND THE PACIFIC

CHAPTER XL

AUSTRALASIA

AUSTRALASIA can be reached either from the east or from the west, so that in this chapter we shall be concerned with the following routes —

1. Via Suez
2. Via South Africa
3. Via Panama Canal.
4. Via South America and Cape Horn.

Thus Australasian commerce figures on all the three great trade routes.

As usual we will first examine the climatic conditions of the region under consideration. We are concerned with tropical, trade wind, Mediterranean and British Isles latitudes, and hence with the climates of these regions

If you consult your physical and climatic maps you will see, then, that the following are well-marked divisions —

1. The British Isles type—Tasmania and Southern New Zealand.

2. Mediterranean—S W. and S E. corners of Australia, North Island and the northern part of South Island, N.Z

3. N.W. Australia—N.W. summer monsoon with rains Dry winter.

4. An area of rainfall all the year round, *i. e.* eastern coastal plain of Australia. Tropical climate in extreme N and N.E. Sub-tropical in Southern Queensland and more moderate in N S W. and Victoria.

5 The grasslands east of the Great Dividing Range

of Australia. These gradually pass into the scrub and desert of Central and Western Australia and the region north of the Great Bight.

6. Tropical savannah country—interior of Northern Territories and N. Queensland.

In fact the general arrangement of vegetation zones in Australia is closely comparable with that of South Africa

Rainfall distribution is again all important, just as it is in the monsoon region. You should especially note the area within the 10″ isohyet and that between the isohyets of 10″ and 20″. Sheep, for instance, will not be found in areas where less than 10″ falls · the 16″ line is about the limit for wheat growing cattle will want more than 20″.

In other words, a rainfall map of Australia, showing the above isohyets, can be taken as marking off roughly the regions through which sheep and cattle are distributed.

Our economic regions in Australasia will be then—

(*a*) Pastoral and agricultural pursuits in Tasmania, and on the grasslands of Australia and the Canterbury plains of New Zealand.

(*b*) Live stock only on the interior tropical savannahs.

(*c*) Mediterranean products in the Mediterranean areas outlined above

(*d*) Timber in S W. Australia (Kairi and Jarrah forests), in tropical regions and windward slopes of Australian mountains, Tasmania and North Island of New Zealand and west slopes of the Southern Alps.

Such is the general distribution of vegetable and live-stock produce.

We shall not have to discuss in detail the industries dependent on these—the student must refer to previous chapters.

One or two additional points call for notice.

The total numbers of sheep in Australasia were, in 1918 —

Australia 76½ million (N S.W. 38 million).
New Zealand 26½ million.
Tasmania 1¾ million.

Next to sheep, cattle and horses are most important. The former, if bred for beef only, come from the savannahs of the Northern Territories, North Queensland and the Kimberley district of North-western Australia. The dairy herds occupy the coastal plains with a more moderate climate (*e g.* Southern Queensland, New South Wales and Victoria, and parts of New Zealand).

Horses are bred largely in the savannahs aforesaid and are exported chiefly to India (for remount purposes), Straits Settlements and Java. Annually some seven to eight thousand are sent oversea Live stock and the products thereof form three-quarters of the total export of New Zealand. The figures of the principal items were, in 1913 —

Wool .	. £8,000,000
Frozen meat	. £4,450,000
Butter and cheese	£3,800,000

Nearly all the exports from New Zealand go to the British Isles. For example, in 1914 we took £21,000,000 worth out of the total export value of £26,000,000. Wheat is not an export from New Zealand but it figures largely on the Australian list. In 1910 well over 50 per cent of cultivated land in Australia was under this crop. The soil is generally suitable throughout the country provided that the rainfall is sufficient. The crop generally averages about ten bushels to the acre as compared with our twenty to thirty bushels. It is a light crop, but profit is possible because the crop is cheaply produced and economically harvested.

The best wheat lands are in Victoria and the southern peninsulas of South Australia. Queensland is the only large producer of maize and, of course, of sugar. The latter crop is important round such centres as Cairns and Bundaberg.

Owing to uncertainty of rainfall in the interior and to the consequent irregularity of the flow of the larger rivers, the problem of irrigation in Australia is receiving increasing attention, and many important schemes have been projected for conserving the water supply. Especially noticeable is the Barren Jack Dam which impounds the waters of the Murrumbidgee River, thus affording a water supply capable of irrigating over a million acres of land. The dam is over 200 feet high and is second in size only to the Aswân dam on the Nile.

Australia is fortunate in possessing several artesian basins, of which the Queensland one is the most extensive and important.

Artesian wells are sometimes suitable for irrigation purposes but are generally more valuable for watering live stock. The cost of boring is heavy. Up to 2000 feet deep it may be anything from 14*s.* to 42*s.* per foot. For greater depths the cost may run to 65*s.* a foot. This makes it an expensive work for farmers to undertake, and so the state often helps by putting down borings along the great stock routes, and at these wells animals *en route* for fresh pastures may be watered at the following rates: Sheep 1*s.* per 100; cattle, horses and camels (note these, they are a sign of desert conditions) at 1*d.* per head.

It is not too much to say that the whole future of Australia as a pastoral and agricultural country must ultimately depend on the water supply, as it is estimated that at least 36 per cent. of the country lies within the 10″ isohyet.

How important is this question may be gauged from the fact that for the five years, 1909–1913, the annual value of the principal pastoral products alone

amounted to nearly £37,000,000, of which wool represented 72 per cent

As additional farm products we must not forget the fruits (especially apples) of Tasmania, the honey, beeswax, wines and fruits of Australia, and the hemp fibre (so-called "flax") of New Zealand.

And there is, of course, a large lumber industry, especially in such woods as we have already noted, and in the Kauri gum of New Zealand and the Huon pine of Tasmania.

A general summary of the export trade in agricultural and pastoral products from Australia and New Zealand shows.

1 A very large trade in wool, foodstuffs, hides, etc, to the United Kingdom.

2 Australian wool also largely exported to the following countries (figures for 1913): Germany (£4,500,000); France (£7,400,000), U S A (£745,000), Japan (£735,000)

3. A large Australian trade in miscellaneous foodstuffs and live stock with India, the Far East (especially Japan) and South Africa

4 Small trade (mainly export) between Australia and South America.

5. A small trade between Australia and New Zealand and the outlying Pacific Islands

Now let us review the mineral resources

Gold has been produced in New Zealand for over half a century. The average annual output is generally valued at about £2,000,000, most of which is sent to Australia. The mines near Auckland are the richest, but gold is also found in Nelson and Otago. Fossil kauri gum of considerable value is exported, mainly to the U S A Coal is found throughout New Zealand, but Greymouth and Westport are the main centres. Latterly the coal exports to the adjacent countries have been increasing.

On the whole New Zealand is unimportant from a mineral point of view.

Not so Australia. This country is third in the world's gold output; in 1912 produced 6 per cent. of the world's silver and was third in the production of tin; she also produces large quantities of lead, zinc and copper. Moreover, she has extensive coalfields (the resources of the N S.W. coal areas being estimated as equal to the whole available deposits of the British Isles coalfields), and considerable iron ore resources.

Tasmania, too, is rich in zinc and tin.

(1) As regards *gold*.—The total value raised between 1851 and 1914 was £564,000,000. At one time the famous Mount Morgan mine in Queensland led in production, but now the West Australian mines are the most valuable, and the Coolgardie mines in 1914 produced five times the quantity of any other state.

Find the following mines in West Australia and make a map of them —Cue, Southern Cross, Coolgardie, Kalgoorlie, Leonora, Mount Margaret.

You will see that all except Cue are connected by rail with the port of Fremantle, and that they are situated in a region of very scanty rainfall (compare the position of Broken Hill, N.S.W.). There are further gold-bearing strata in the Ashburton and Pilbarra districts.

Goldfields in other states in order of production value are: Bendigo, Mount Morgan, Beechworth, Charters Towers, Ballarat, Castlemaine, Cobar, Gympie.

(2) *Coal*—This is mined chiefly in N S W., especially at Newcastle and Lithgow. The coal deposits are estimated as covering 16,550 square miles.

Much is used for home manufacturing purposes and much is exported. The principal countries to which N S W. coal was exported in 1913 were:—

Chile (£369,417), New Zealand (£254,338), Java (£144,000), Straits Settlements (£81,771), U.S A. (£50,559), Hawaii (£47,323), Peru (£53,926)

This was exclusive of bunker coal, which overseas vessels took aboard at Sydney to the amount of over a million tons.

Ipswich and Dawson are important coalfields in Queensland, West Australia gets its supplies from Collie, and Tasmania has a supply at Fingal which is supplemented by imports from Sydney.

(3) The famous Broken Hill mines, to which we have often referred, were first used to produce silver: they are now also producing lead and zinc, the latter of which is largely obtained by chemically treating the waste tailings from former years' working. The largest company, the Broken Hill Proprietary Co., has its smelting works at Port Pirie, to which the ore can be sent by rail. In 1915 this company opened very large iron and steel works at Newcastle (N S.W.). Coal and limestone can be obtained on the spot, and the iron ore is imported by sea from South Australia, where is situated the Iron Knob and Iron Monarch hills, practically composed of iron ore and estimated to contain 21 million tons of ore (see Chapter VI).

This is a very important enterprise, as the company reckon on producing before long 170,000 tons of steel annually.

Iron ore is also found at Lithgow, where the Eskbank Ironworks Co have a large output of pig-iron and steel.

In short, the general growth of Australian manufactures of all kinds, and especially of iron and steel, during the war has been nothing short of remarkable.

The Table given on the following page shows details of copper and tin production in Australia.

The principal imports into New Zealand come from the U K and are mainly textiles and machinery.

The same holds good for Australia, though considerable quantities of textiles come also from Germany and France, and iron and steel goods from the U S A Additional imports into Australia are:—

Tea from Ceylon; jute bags and sacks from India; oil from the U S A; textiles, brushes and sulphur from Japan, sugar from Java, motor-cars from Canada; timber and gold from New Zealand.

	Locality		Value (£) 1914	Comments
Copper	Cloncurry	Q	497,098	Cloncurry is the richest ore area in Australia
	Mt Morgan	Q	471,658	
	Moonta	S A	417,487	Total value of copper output for Australia in 1913 was £3,269,385 (Queensland £1,660,178)
	Wallaroo	S A		
	Kapunda	S A		
	Mt Lyell	Tas	427,704	
	Cobar	N S W	116,460	Exports (in order of value) to U K., Belgium, U S A, Germany, etc
Tin	Herberton	Q	189,069	Total output for Australia in 1913 was £1,401,571 Exports to India, Ceylon, Japan and Straits Settlements
	Chillagoe	Q	46,773	
	Cooktown	Q	38,065	
	Stanthorpe	Q	31,221	
	Mt Bischoff	Tas	157,500	*N B*—The ore was exported to Straits Settlements for treatment

In 1913 the various countries importing into Australia were (the figures refers to millions of pounds sterling)—

The U.K. (47½); U.S A. (9½); Germany (5); India (3); N.Z. (2½); Canada (1).

The preponderance of trade within the British Empire is most marked and very satisfactory.

Communications.—The Australian rivers, for reasons already given, are not very valuable for transport purposes. Hence communications are mainly by rail. Unfortunately, railway transport is greatly hindered by differences in gauge between the lines of the various states, and it is not very easy to remedy this, for the cost of altering the lines to one single gauge (4½ feet) has been estimated to be £37,000,000.

As we remarked in a previous chapter, the longest journey which can be undertaken on one continuous line, irrespective of change of gauge, is from Longreach to Oodnadatta, a distance of 3300 miles.

If we wanted to go from Brisbane to Adelaide we could do the 1790 miles journey in three days. These

facts give us some idea of the huge distances to be covered in such a country.

Most of the lines are run by the various states, but the Commonwealth Government own the newly completed Kalgoorlie–Augusta line and is building another to connect Port Darwin with Oodnadatta In this way Australia will before long be traversed from north to south as well as from east to west.

You should notice how the railway in the eastern states follows the coastal plain where possible and also uses the gaps in the mountain ranges Thus we have —

1. The line from Sydney crossing the Hawkesbury River by a long bridge, traversing the Hunter Gap and so reaching the Liverpool Plains

2. The Goolburn Gap leading to the Lake George Plateau and the site of the new Federal capital Yass.

The Toowoonba Gap leading from the interior plateau to Brisbane Both of these gaps are followed by the main railway

3 Branch lines into the interior to such places as Hay, Mildura, Bourke, Cobar, etc.

The total mileage of rail is now about 23,000 miles, or the same as that of the British Isles

In New Zealand similar conditions prevail as regards river transport and mountain obstacles.

The most noteworthy rail is the one being constructed (with a tunnel 5½ miles long at Arthur's Pass) to connect the east and west coastal plains of South Island

The ports of Australasia are good. Sydney, Hobart and Auckland are all first rate; important, too, are Wellington, Dunedin, Port Lyttleton, Brisbane, Adelaide, Melbourne, Rockhampton, Perth and Fremantle.

By far the greatest share of overseas transport falls to British ships. We must not forget that the Australian Federal Government has lately begun to run a line of cargo steamers of its own, which marks a new departure in colonial state enterprise.

Lastly we have to consider how the trade is portioned out between the various routes. This is not an easy question: it is complicated by many factors. But we may make a few suggestions which we will tabulate thus:—

(1) Sailing vessels from Europe to Australasia will go out via the Cape of Good Hope and return via the Horn.
(2) The Cape route of S. Africa is longer than the Suez route but—
  (*a*) It avoids canal dues and delays.
  (*b*) Bunker coal at S. African ports will be cheaper than at Port Said.—Why?
(3) The Panama route is no advantage for U.K. ships seeking Australian ports, but a slight advantage over Suez route as regards New Zealand ports if we consider distance only. We have to remember that canal dues will have to be paid in both cases, and that the Pacific Ocean offers but one coaling station and no trade *en route*.
(4) But the Panama route favours New York, which is now but 9000 miles from Wellington, whereas Liverpool is 11,500 by that route.
(5) From statistics it is clear that the British mercantile marine takes a considerable share in the export trade from Australia to the ports of Western Europe.
(6) Ships carrying Australian exports to South Africa and South America have a profitable outward voyage but must often return in ballast because these countries have little to send Australia.
(7) There will be a considerable employment of shipping between the East Indies and Australia and between Australia and New Zealand.
(8) The return traffic from Australia to Western Europe uses the Suez and South African routes in about equal proportions.

So you see Australian shipping is concerned with all the great trade routes.

QUESTIONS ON CHAPTERS XXXIV—XLI

85. The following is the order of importance of British Indian ports Calcutta, Bombay, Karachi, Rangoon, Madras Account for the superiority of Calcutta and the inferiority of Madras

86 Discuss the geographical factors which determine the importance of Dairen, Singapore, Shanghai and Kobe

87 The total tonnage entered and cleared at Hong-Kong annually is over 20 million tons Account for the large volume of trade at this port

88 Japan has a considerable trade in brushes, buttons and matches Whence does she get her supplies of raw materials for these industries?

89 What is the main export from the Falkland Islands? It will be exported from Port Stanley. What other reasons make this port important? Whence might it draw supplies of coal?

90 Compare China and Brazil as regards future commercial development

91 What alternative routes can you suggest for exporting a consignment of hides from British East Africa to London?

92 Draw a diagram showing the Cape to Cairo railway route Suggest alternative routes for linking it with the Egyptian railways

93 Hides and rubber are the chief exports of Madagascar Examine climatic and vegetation maps and then account for the presence and distribution of these products.

94 The export of rice from Siam in 1917–1918 was valued at £7,467,510 Most of the crop is exported to Singapore and Hong-Kong Account as fully as you can for the above facts

95 What shipping lines serve the following routes.—

Hamburg—Rio de Janeiro, London—Tokio; Genoa—Buenos Ayres; Southampton—Mombasa?

CHAPTER XLI

THE PACIFIC

We have already learnt some scattered facts about the trade of some countries bordering the Pacific Ocean; let us add a few details concerning those islands and countries we have as yet hardly mentioned. They fall into two groups —

(A) The Pacific Islands.
(B) The Western States of South America.

We will take the island groups first. Naturally they have a similarity in resources: the usual tropical island products such as copra, coco-nuts and sugar, together with miscellaneous items like bêche-de-mer and phosphates (*e. g.* in Fanning Islands). Copra is the staple industry throughout and is shipped from most of the groups of islands to Australian ports, whence it can be redistributed.

Only two groups of islands call for mention, viz.—

(1) Hawaii (U S A.).
(2) Fiji (British).

Both produce sugar on a large scale. Hawaii has the additional advantage of being more in the track of trans-Pacific trade, and Honolulu's fine harbour, therefore, has some strategical significance.

The natural destinations of the sugar crop, failing Japan as a customer (for which see page 239), are obviously the U.S A., U.K., N.Z. and Canada.

The Hawaiian crop is sent to the nearest convenient American port—in this case San Francisco, where we may expect to find sugar refineries.

The islands in return will require miscellaneous

foodstuffs, cotton cloth and hardware The U K. and U.S A will supply the manufactures, Australasia the foodstuffs; New Zealand takes a large share of this export trade and imports tropical fruits such as bananas

Now for group B

There is not much to detain us here Cacao from Ecuador and sugar from the irrigated lands of Peru are the only foodstuffs exported

Mineral wealth is the chief asset We note—

Bolivia—Tin and silver (Huanchaca mines, Potosi and La Paz)
Peru—Silver, copper, nitrates.
Chile—Copper, nitrates (North Chile).

The products are exported from, say, Antofagasta, Mollendo, Iquique, etc

Notice that Bolivia has no seaboard and must therefore export via the Chilean port of Antofagasta.

Australia, New Zealand and Japan are not likely to require minerals, as the first named can supply tin and silver and Japan can supply copper. So we may expect the exports from the South American Pacific border to go to the U S A. via the Panama Canal, and to Europe either through the Canal or via Cape Horn. Sailing vessels will, of course, take the latter route. We have already called attention to the fact that the lack of coal along the Pacific border has allowed the sailing ship to continue in considerable numbers along this route. This lack of coal means large imports from the U K , the U S A and Australia. The Panama short cut has enabled the U.S A to increase her coal, iron and leather exports at our expense, though our textile exports still hold their own in these states

German competition also used to be very active, and the German mercantile marine was well represented in the Pacific.

We said in the last chapter that we might expect to find a cross-Pacific trade between Japan and Canada. As a matter of fact the pre-war trade was insignificant. The war period has, however, somewhat altered the commercial aspect, and Canada now imports Japanese textiles, sulphur, etc., and sends in return about £1,000,000 worth of timber, agricultural machinery and motor-cars.

The chief features, then, of Pacific trade seem to be—

1. An increase of U.S.A. activities to Pacific ports of South America.
2. A general export of raw products from these states to U.S.A. and Europe, and imports of coal and manufactured goods therefrom.
3 A small import trade from Australasia.
4 Sugar and copra exports of the Pacific Islands.
5. Considerable exchange of goods between the Pacific Islands and Australasia.

INDEX

[NOTE.—Where a subject is dealt with in full detail it is indicated by thicker and larger figures.]

AACHEN, 48, 160
Aberdeen, 80, 87, 105
Adelaide, 16, 251
Aden, 40
Advertising, 68
Aerial transport, 31, 36
Africa (South and West), 221–227
Aire Gap, 74, 120, 126
Alexandria, 20, 184
Alpaca, 138
Alps, railways across, 53
Aluminium, 213
Amazon, 11, 30, 46, 191, 192, 193
Amsterdam, 160, 166
Angora goat, 13, 223
Antwerp, 16, 48, 166, 232
Archangel, 167
Argentine, 8, 9, 14, 16, 63, 93, 133, 166, 191, 192, 193
Arica, 55
Arrowroot, 157
Artesian Wells, 246
Asbestos, 201
Ascension Is., 41
Asphalt, 157, 196
Assam, 10, 236
Auckland, 247, 251
Australasia, Chap XL
Austria-Hungary, 176–177

Bagdad railway, 54
Bahia, 20, 156, 193
Baku, 27, 185
"Ballast," 42, 43
Baltic plains, 10, 163, ports, 165, products, 167
Baltimore, 213, 218
Bananas, 93, 156
Banka, 26
Barcelona, 172, 187
Barley, 9, 10, 160, 184, 200
Barrow (Port), 101, 131
Basle, 48, 174, 175
Batavia, 156, 157
Bêche de-mer (sea-slug or trepang), 254
Belfast, 100, 101, 105, 118, 126, 135
Belfort, 170, 171
Belgium, 47, 48, 160, 161, 165, 166
Berkhampstead, 121
Bethesda, 79
Bilbao, 172
Billiton, 26
Bill of lading, 66
Birkenhead, 86, 100, 101, 122
Birmingham (England), 107, 108, 109, 122, 125
—— (U S A), 215
Bischoff, Mt., 26, 250
Black Sea products, 181, summary of trade, 188
Blast furnaces in U K, 132, Germany, 163, U S A, 214, 215
Bolivia, 27, 63, 255
Bombay, 20, 232, 234, 236
Bordeaux, 48, 170
Boston (U S A), 211, 218

Bradford, 137
Brazil, 10, 11, 19, 20, 21, 63, 156, 158, 191, 192, 193
Bremen, 45, 165
Breslau, 163
Brewing, 73, 174
Briey, 25, 170
Brisbane, 16, 156, 250, 251
Bristol, 37, 88–98, 122, 154, 156
British Guiana, 10, 156
Broken Hill (N S W), 57, 164, 249
Brushes, 238, 239, 249
Buda-Pest, 54, 176, 177
Buenos Ayres, 55, 56, 193
Buffalo (town, U S A), 146, 209, 216, 218
Building stones, 79, 80, 213
Bulgaria, 178
Burgas, 178
Burgundian Gate, 171
Burma, 11, 77, 229, 230, 234

Cables, submarine, 41
Cacao (cocoa), 10, 92, 156, 167, 193, 196, 225, 255
Calcutta, 39, 157, 232, 233, 236
California, 27, 205, 207, 211, 217
Callao, 20, 156
Canada, 196–204
Canals, 35, U K, 91, 107–112, N W Europe, 48, Germany, 48, 163, 164, 175, U S A, 49, 216, Canada, 203, 204
Canary Is, 40
Canterbury plains, 14
—— lamb, 152
Cape to Cairo Railway, 55, 223, 226, 227
Capital, 62–64
Cardiff, 85, 90, 122, 129, 132
Carlisle, 119, 120
Carpets, 138
Castor-oil seeds, 232
Cattle cake, 140
Cement manufacture, 80, 158, 213
Census, 127
Central plain of Scotland, 125
Central America, 156, 157
Cette, 48, 172
Ceylon, 23, 229, 231, 233, 249
Charlestown, 20, 218
Chemical industry and exports, 140, 156, 225, 229, 254, 256
Chemnitz, 23, 163
Cherbourg, 169
Chicago, 7, 152, 210, 216, 217, 218
Chile, 9, 23, 55, 57, 63, 255
China, 19, 23, 24, 26, 57, 233, 234, 238, 239, 241, 242
China-clay (kaolin), 79, 141
Cinchona tree, 157
Cinque Ports, 83
Climate, 4, influence on vegetation, 5–7, U K., 72, S Europe, 179, Canada, 199, U S A., 205, Africa, 221, 222; Asia, 228, 229, Australia, 243, 244
Cloncurry, 157, 250
Coal, 23, 24, U K., 79, export from U K, 129, 130, resources of U K, 130, Europe, 160; Canada, 201, U S A, 212, Africa, 222, India, 234, Australia, 247, 248
Coblenz, 174
Coconuts, 63, 229, 242
Coffee, 10, 156, 192, 219
Cologne, 174, 175
Colombia (S America), 63, 156
Colombo, 24, 157
Congo, 47, 226, 227
Copal, 225
Copper, 26, 79, 85, 161, 180, 201, 212, 219, 222, 223, 224, 230, 238, 241, 250, 255
Copper sulphate, 170, 183
Copra, 140, 156, 225, 229, 254, 256
Coral, 183
Cork, 179, 181
Cork (town, Ireland), 105, 126
Costa Rica, 10, 156
Cotswold industries, 80, 136, 137
Cotton, 18–21, 157, 178, 183, 184, 206, 218, 225
—— industry U K, 134, 135, Germany, 163, France, 170, Russia, 167, U S A, 213,

Cotton industry, India, 230, 231, 232, 239, Japan, 238
Coventry, 128, 136
C P R, 56, 57
Cradley, 125
Crewe, 122, 127
Cuba, 23, 219

Danzig, 48, 165
Darjeeling, 10, 229
Darlington, 119, 121, 122, 133
Dates, 157
Dawson City, 201
Delivery note, 66
Deltas, population of, 59, 60
Demerara, 156
Denmark, 153, 160
Derby, 122
Diamonds, 166, 219, 222, 224
Distributing centres in relation to population, 125
Dock dues, 67
Doncaster, 90, 121, 122, 133
Donetz coalfield, 180
Dortmund, 161, 162
Dover, 38, 115, 118, 130
Drifters, 155
Droitwich, 78
Dublin, 105, 126
Duisburg-Ruhrort, 49, 163
Duluth, 209, 218
Duna, river, 161
Dundee, 87, 105, 136, 138, 232
Durban, 16, 223
Durham, 119, 121
Dyes, 73, 139, 156, 173, 219, 234

Ecuador, 10, 156, 255
Edinburgh, 86
Eggs, export of, 167, 177, 178, 181, 184, 200
Egypt, 19, 20, 21, 33, 184
Ekaterina, 55
Elba, 131, 183
Elevators (grain), 95, 185, 209
Ellesmere Port, 108, 139
Emden, 165
Ems canal, 161, 163
Erie canal, 209, 216
Esparto grass, 179, 181, 187

Fahlun, 161
Falkland Is., 14
Fall line, 206, 207, 213
Festiniog, 79
Fiji, 10, 254
Fishguard, 82, 118, 122
Fishing industry U K, 149–152, Europe, 161, 180, 181, 187, Newfoundland, 197, Canada, 199, 202, U S A, 211
Flax, 161, 164, 167, 247
Fleetwood, 118, 152
Flour manufacture, 147
Formosa, 10, 234, 239
Fowey, 79, 83, 87
France, 166, 169–172, 186
Frankfurt-on-Main, 48, 163
Freestone, 80
"Freight," 32
Fremantle, 16, 248, 251
Frozen-meat industry *See* Live-stock

Galveston, 20, 218
Gannister, 80
Geelong, 16
Gefle, 161
Gellivara, 25, 161
Germany, 161–165, 174, 175
Gibraltar, 40, 188
Glasgow, 38, 86–88
Glass industry, 140, 163, 164, 176, 177, 213, 215
Glenmore, 74
Gloucester, 38, 92
Glycerine, 186
Gold, 27, 201, 212, 222, 224, 225, 247, 248
Grand Trunk Pacific Railway, 203
Granite, 79, 80
Grasslands, types of, 6, 191, population of, 60
Great Lakes, the, 49, 146, 205, 209, 216
Greenock, 100, 156
Grimsby, 86, 87, 150, 151
Ground-nuts, 139, 225, 232
Gum, 157, 225, 247

Halle, 160

Hamburg, 45, 162, **165**, 225, 232
Handling of cargo, **67, 68, 94, 95**
Hankow, 57, 241
Hanseatic League, 34
Harz Mts, 25
Hawaii, 10, 23, 24, 41, 219, 248, 254
Health resorts in U K, 115, 127
Hematite, 131
Hemp, 135, 157, 161, 182, 193, 202, 247
Heysham, 118
Hides, 153, 167, 192, 232
Hobart, 16, 251
Hong-Kong, 23, 238, 240, 241
Honolulu, 24, 41, 238, 254
Hudson-Mohawk Gap, 205, 206, 217
Huertas, 187
Hull, 77, 86, **88–98**, 140, 145, 146, 150, 165, 232
Hungary, plain of, 8, 14, 176, 177

India, 19, 20, 21, 23, 27, 57, 135, 139, 145, 153, 157, 182, 183, 187, 188, 223, **228–237**, 239, 245
Indies (East), 11, 157, 239, 252
—— (West), 10, 19, 20, 21, 41, 51, 93, 156, 196, 204
Indigo, 234
Ipswich, 78, 127
Iron, cast, 130, wrought, 131, galvanized, 132
Iron ore world's supply, **25**, U K, **131**, Sweden, 161, N Spain, 172, Mediterranean, 180, 183, Russia, 185, Newfoundland, 197, Canada, 202, U S A, 212, 214, 215, India, 234, Japan, 239, China, 241, Australia, 249
Irrigation U S A, 210, India, 235, Australia, 246
Italy, **181–184**
Ivory, 225

Jamaica, 157, 196
Japan, **237–241**, 10, 26, 65, 135, 194, 203, 229, 230, 231, 234, 255, 256
Jarrah tree, 77, 244
Java, 10, 157, 167, 233, 248, 249
Johannesburg, 222, 224
Jute, 136, 202, 232, 249

Kano, 225
Kaolin *See* China-clay
Kara Sea route to Siberia, 167, 168
Karachi, 20, 145
Karri tree, 77, 244
Katanga, 223
Kettering, 122, 132
Key West, 217
Khiya, 19
Khojend, 19
Kilmarnock, 133
Kimberley, 222, 224
Kola-nut, 225

Labour, importance of supply of, 64, 65
Lancashire, industrial centres, 73, 134, 135
Landing dues, 67
La Paz, 55
Lead, 27, 79, 157, 177, 180, 212
Leather industry, 153, 154, 177, 210, 211, 219, 225
Leeds, 90, 119, 122, 132, 137
Leicester, 122, 134, 153
Leith, 86, 105, 150
Lemons, 178, 182
Les Palmas, 40
Libau, 167
Liege, 48, 166
Lille, 24, 166
Limon, 156
Linen industry U K, 126, 135, 136, Germany, 164, Russia, 167, Belgium, 161
Linseed, 140, 167, 193, 232
Lisbon, 187, 188
Liverpool, **86–88**, 122
Live-stock and dairy produce U K, 15, 152, Europe, 160, Argentine, 152, 193, Brazil, 193, Canada, 200, U S A, 210, 211, Africa, 223; Australia, 244, 245, New Zealand, 245

Llama, 13, 56
Llanberis, 79
Llanelly, 132
Lloyds, 43
Lobito Bay, 227
Lombardy, 182
London, 15, 88, 136, 192, 233
Lorenço-Marques, 224
Lubeck, 165
Luton, 123
Luxemburg, 25, 161
Lyons, 170
Lys valley, 161

Machinery, manufacture and trade, 69, 133, 180, 184, 192, 202, 215, 249, 256
Madras, 38, 229, 234, 235
Magdeburg, 160
Mainz, 174
Maize, 6, 9, 178, 184, 208
Malaya, 11, 85, 157
Malta, 188
Manchester, 86, 111, 112, 122, 125, 135
Manchester Ship Canal, 111, 112
Mangrove tree, 153
Manilla, 157
Marble, 183
Margarine, 140
Marseilles, 45, 173, 185–187, 225, 232
Matches, 238
Mauritius, 10, 40, 156, 233, 236
Mediterranean products, 7, 9, Chap XXXIII, 200, 207, 223, 244
Melbourne, 16, 39, 251
Mendip Hills, 73, 126
Mercantile Marine of the world, Chap X, U K, Chap XX, Europe, 44, 45, 184, South America, 195, U S A, 220, Japan, 240, 241, Australasia, 251
Merino sheep, 14, 15
Merthyr, 132
Mesopotamia, 21, 33, 54
Mexico, 23 27, 157
Mica, 234
Middlesborough, 35, 119, 132
Middlewich, 78
Milan, 53, 182, 183
Milford Haven, 81, 82
Milling, 147, 209
Milwaukee, 209, 211
Minerals, Chap VI
Mississippi river, 216
Mobile, 20, 218
Mohair, 138, 181, 223
Monsoons, 19, 228, 229
Montevideo, 56, 193
Montreal, 57, 203
Moscow, 160, 167
Motor-cars, 202, 215, 249, 256
Mount Morgan, 157, 248, 250
Mulberry tree, 170, 179, 183, 229
Munich, 54, 174
Murman coast, 55
Myrobolan, 153

Nagpur, 19, 231, 234, 236
Nancy, 25, 54, 170
Nantwich, 78
Narvik, 161
Naval Stations in U K, 87
Neath, 132
Newcastle (U K), 74, 77, 100, 101, 120, 121
—— (Australia), 23, 248
—— (Natal), 222, 223
Newfoundland, 197
New Orleans, 20, 158, 209, 217, 218
Newport (Mon, U K), 85, 90, 122, 132
Newport News (U S A), 218
New York (City), 192, 209, 211, 217, 220
New Zealand *See* Australasia, Chap XL, also 15, 50, 152, 153, 254, 255
Nigeria, 11, 21, 225, 226
Nile river, 19, 60
Nish, 54
Nitrates, 255
Norway *See* Scandinavia
Norwich, 127, 136
Nottingham, 122, 134
Nyassaland, 10, 21

Oats, 10, 167, 200, 208

Obi river, 168
Oil *See* Petroleum
Oilseeds, 93, 139, 140, 186, 232
Olive-oil, 180, 181, 183
Olives, 179, 182
Onions, 181, 184
Opium, 234
Orange Free State, 54
Packet stations in U.K., 115, 118
Packing for transport, 69
Paisley, 134
Palm-oil, 140, 156, 225
Panama canal, 49, 50, 51, 252
Paper, 86, 197, 211
Paris, 45, 171
Patna, 234
Pembroke Dock, 82
Pennsylvania, 23, 27, 212
Pensacola, 20, 218
Pepper, 157
Perfume, 178, 182
Pernambuco, 10, 20, 156
Persia, 16, 54, 233
Perth (Scotland), 126, 139
Peru, 11, 19, 20, 27, 55, 63, 155, 156, 157, 255
Peterborough, 80, 122
Petrograd, 167
Petroleum, 27, 28, 157, 177, 178, 181, 184, 185, 196, 197, 201, 230, 239, 242
Philadelphia, 213, 216, 218
Phosphates, 170, 179, 183, 213, 254
Piedmont Belt, 60, in U S A, 206
Piedmont (district—Italy), 182, 183
Pilsen, 23, 176
Pit-props, 77, 161, 170, 187
Pittsburg, 214, 215, 216
Population, 59–61; of Br. Isles, 124–128, N and S America, 190
Portages, 34
Port Nolloth, 224
Ports, 37, 38, of U K., 83–98, Germany, 164; Russia, 165, 185; France, 170, 186, Italy, 184, Spain, 172, 187; Portugal, 187, Canada, 38, 203, Africa, 38, 226, 227, U S A., 215, 218, 219, 220, Australasia, 251
Port Sunlight, 140
Portugal, 187
Pottery industry, 141, 142, 164, 213
Prince Rupert, 204
Punjaub, 5, 16, 145, 200, 235
Quebracho, 153, 167, 193
Quicksilver (Mercury), 177, 180, 213
Quinine, 157
Railways; 52 ff., U.K., 113–123, Europe, 53–55, 171; South America, 55, 56, U S A., 56, 216, 217, Canada, 56, 103; Africa, 226, 227; Australasia, 57, 250, 251; India, 57, 235; Siberia, 55, 240, Japan, 240, China, 57, 242
Rainfall, importance of, 72, 73, 223, 246
Rand, the, 27, 224, 225
Rangoon, 157
Raniganj, 20, 23
Rape seed, 140, 232
Reading, 74, 106, 126, 127, 132
Redditch, 125
Rhine river, 162, 164, 174, 175
Rhone river, 186
Rice, 11, 157, 178, 182, 184, 229
Riga, 161, 167
Rio-de-Janeiro, 156, 158, 192, 193, 195
Rio Tinto mines, 132, 180
Roads in U K., 35
Rosslare, 82, 118
Rotterdam, 166, 167, 172, 173
Rubber, 11, 154, 155, 192, 193, 229
Ruhr coalfield, 23, 160, 161, 163
Rumania, 9, 27, 178, 182, 183
Russia, 167, 168, 185
Rye, 10, 160
St Austell, 79
St Etienne, 24, 170
St Helena, 41

St Helens, 86, 141
Sailing routes, 39, 40
Salt, 78, 140, 141, 164, 177, 187
San Francisco, 217, 254
San Paulo, 156, 192
Santander, 25, 172
San Thomé, 156
Savannah, port of, 20, 218
Savannahs (grasslands), 6, 157, 225, 245
Scandinavia, 89, **160–162**, 187, 241
Sedan, 170
Sesamum, 232
Setubal, 187
Seville, 187
Sheffield, 90, 119, 122, 132
Shipbuilding, 86, **100, 101**
Shipping combines, **102–105**
Shipping Companies (foreign), 45
Shipping movements on great trade routes Mediterranean and Black Sea, 188, Atlantic, 158, 191, 204, Suez and Indian Ocean, 242, Australasia, 252, Pacific, 255, 256
Ship-repairing, 101
Shoddy, 137
Sicily, 182
Silesia, industries of (German), 163, 164, (Austrian), 176
Silk U K, 136, Germany, 163, France, 170, Switzerland, 173, Italy, 183, U S A, 213, Asia, 229, 238
Silo, 67, 95 *See also* "Elevator"
Silver, 27, 157, 201, 212
Singapore, 41, 236, 238, 240, 241
Sisal Hemp, 157
Slate, 79
Soap manufacture, 140, 141, 154, 187
Southampton, 87
Soya Bean, 139, 140, 239
Spain, 172, 187
Spelter, 26
Spices, 157, 229
Sponges, 181
Stassfurt, 164
Steel manufacture U K, **131, 132**, Germany, 163, France, 170, Canada, 202, U S A, **214, 215**, India, 234, 235, Australia, 249
Stirling, 126
Straits Settlements, 23, 24, 236, 248
Strassburg, 48, 54, 163
Stroud, 137
Sudan, 21, 157
Sudbury, 201
Suez Canal, 16, 49, 50, 242
Sugar, 10, 156, 160, 161, 177, 182, 192, 196, 219, 223, 229, 233, 254, 256
Sulphur, 180, 238, 249, 256
Sumatra, 23, 230
Swansea, 86, 105, 132
Sweden *See* Scandinavia
Swindon, 122, 127
Switzerland, **172, 173**
Sydney, 16, 38, 248, 251

Tanning, 86, **153, 154**, 167
Tar, 55, 167
Tasmania *See* Australasia
Tea, 10, 157, 229, **233, 234**, 249
Teak, 77, 157, 229
Teazle, 137
Tees river ports, 85, 86, 100, 101, 105, 108, 115, 121
Texas, 27, 207, 215
Thames Gap, 74, 122
Timber, 7, 64, of British Isles, **77, 78**, Central America, 156, Europe, 161, 167, 174, 197, Canada, 199, 200, U S A, 211, 219, West Africa, 225, Australasia, 244, 247
Tin, 26, 79, 85, 132, 157, 222, 230, 241, 250, 255
Titanic s s, 38
Tobacco, 92, 165, 167, 179, 184, 193, 203, 206, 218, 219
Tokio, 45, 241
Tonnage, definition of, 42
Transport, essentials of, **29–32** *See also under* Shipping, Railways, Inland Waterways, etc
Trawling, 155

Trieste, 177, 178
Trinidad, 157, 196, 197
Tundra, 59, 191
Tungsten *See* Wolfram.
Tunis, 170
Turin, 53, 182
Tyne Gap, 74, 86, 119, 120
—— river ports, 85 86, 100. 101. 105. 108, 115, 121, 136, 162, 165

Uganda, 10, 242
Ujiji, 226
United Kingdom. **Part II** throughout, trade with N. Europe, 162: Mediterranean, 181; S America, 194; British possessions in N. Atlantic, 203, 204: U S.A., 219, 220: Africa, 223; India and Far East, 230 232. 233 237. 238: Australasia, 247, 249 250, 251; Pacific, 254, 255
Uruguay, 56. 193 223
U S A., 205–220

Valetta, 188
Vancouver, 24, 56, 57, 201, 203
Varna, 178
Vegetable ivory, 157
Vegetation types, 5–7
Venezuela, 63, 156 191
Vera Cruz, 156
Verona, 53
Vienna, 54, 176, 177
Virginia, West, 23. 212

Walsall, 125
Wankie, 222. 223
Wattle, 153
Wedgwood, 142
Welland canal, 47, 146
Wellington (Somerset), 137
—— (N.Z.), 251
Westphalia, 25. 160, 162. 172
Wheat, 8. 9, 143–147, 177, 182. 184. 193 208, 245, 246
Wine (vine), 170. 174. 175, 176, 177, 180. 223
Winnipeg, 57. 198, 203, 204
Witney, 137
Wolfram. 79. 131. 187. 234
Wood-pulp. 197. 202. 211
Wool. 13–17, 86: Br. Isles, 136–138; Germany. 163: N. France. 166. 170: U.S.A., 213; Africa. 223: Japan. 239
Worcester (England), 142
—— (S Africa), 223

Yenesei river. 168
Yorkshire industrial centres. 132. 137. 138
Yucatan, 157

Zimbabwe, 224
Zinc. 26, 27. 79, 85, 132, 164, 189, 212, 249

Printed in Great Britain by Richard Clay & Sons, Limited, Brunswick St., Stamford St., S.E. 1, and Bungay, Suffolk.